OHIO STATE BUILDING.

FINAL REPORT

OF THE

OHIO STATE BOARD

OF

CENTENNIAL MANAGERS

TO THE

GENERAL ASSEMBLY OF THE STATE OF OHIO.

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1877.

UNITED STATES CENTENNIAL COMMISSION FOR OHIO.

ALFRED T. GOSHORN, Commissioner, ... CINCINNATI.
WILSON W. GRIFFITH, Alternate, ... TOLEDO.

OHIO STATE BOARD OF MANAGERS.

RUFUS P. RANNEY, ... CLEVELAND.
RUTHERFORD B. HAYES,* . . . . . FREMONT.
EDWARD F. NOYES, ... CINCINNATI.
GEORGE W. McCOOK, ... STEUBENVILLE.
BARNABAS BURNS, ... MANSFIELD.
RALPH P. BUCKLAND, ... FREMONT.

F. W. GREEN, *Secretary*, ... CLEVELAND.

* Governor R. B. Hayes resigned on July 3, 1876, and was succeeded by Hon. Ralph P. Buckland.

PART I.

REPORT OF THE BOARD.

The Centennial Exposition at Philadelphia, in 1876, was intended to accomplish a double purpose. It celebrated, in an appropriate and impressive manner, the hundredth anniversary of American Independence, and afforded a good opportunity for marking the progress made by the American people during their first century of national existence in education and its practical results, as evidenced in the application of intellectual and inventive power, skilled labor, and scientific knowledge to manufactures, agriculture, and the general development of its great and varied natural resources.

The claim of the people of Philadelphia that it should be held in that city as "the cradle of our country's liberty," having been conceded to be just and well founded, an act of Congress was passed March 3, 1871, which gave a national character to the undertaking. It provided that an exhibition of American and foreign arts, products, and manufactures should be held at Philadelphia in 1876.

This character having been given to the project, every State in the Union had an equal interest in it, and a right to see that it would be carried out in such a manner as would be creditable to all the States; and, to this end, the same act of Congress created the United States Centennial Commission, consisting of one delegate and one alternate delegate from each State and Territory, appointed by the President of the United States on the nomination of the Governors of the respective States and Territories. Such additional legislation was had from time to time as experience and the advancement of the work showed to be necessary. On the 1st of June, 1872, Congress by law created the Centennial Board of Finance; a body charged with the management of the financial business of the Exhibition, the obtaining of subscriptions to stock, etc. All moneys received were to be used for the erection of suitable buildings, with appliances necessary for the carrying out of the first or creative act. This Board was further charged with the work of converting the property into money after the Exhibition closed, and distributing the surplus over liabilities among the stockholders, in satisfaction, and discharge of their respective shares.

In July, 1873, the President of the United States issued a proclamation, setting a time for the opening and closing of the Exhibition, and commending it to the people of the United States and of all nations. A copy

of this proclamation was transmitted by the Secretary of State to each minister or representative of a foreign country, with an expressed hope that his government might deem it proper to cöoperate, under the auspices of the United States in the proposed celebration; and that "the opportunity afforded by the Exhibition for the interchange of national sentiment and friendly intercourse among the various nations might result in new and still greater advantages to science and industry."

In January, 1874, the President issued an executive order appointing a Board to represent the Executive Departments, the Smithsonian Institution, and the Department of Agriculture.

In June, 1874, Congress passed an act requesting the President to repeat the invitation to the governments of all civilized countries to take part in the Exhibition; another, directing appropriate medals to be struck at the Philadelphia mint, and a third, directing that all articles imported for exhibition should be duty free. And finally, February 16, 1876, an act of Congress appropriated $1,500,000 for the purposes of the Exhibition.

In accordance with the spirit of this legislation, Ohio took active measures for the appropriate representation of her industries and resources. The efforts made in this direction, and the condition of the work up to January 1, 1876, were shown in the first annual report of this Board. At the date of that report, the members of this Board could only state their opinion that the proposed exhibition would compare creditably with those of a similar character which had preceded it. It is with great satisfaction that they now declare that expression of opinion to have been more than justified. The Exhibition of 1876 has passed into history as the greatest in all respects that has yet been seen, and as reflecting the highest credit on the energy and enterprise of the American people. Its wonderful success is the more gratifying from the fact that it originated with and was almost entirely the work of the people, and not of the Government, as was the case with the exhibitions heretofore held. Government aid was not extended until individual and State effort had shown that success was assured under wise and thoroughly honest and economical management.

The entire amount expended in the erection of buildings and improving the grounds was seven millions of dollars. This amount was derived from the following named sources:

Pennsylvania appropriation	$1,000,000
Philadelphia appropriation	1,500,000
Concessions, gifts, etc	500,000
Stock subscriptions	2,500,000
Government appropriation	1,500,000

The number of visitors and the cash receipts, compared with those of previous international exhibitions, were as follows:

Year.	Exhibition.	Days Open.	Visitors.	Receipts.
1851	London	141	6,170,000	$2,530,000
1855	Paris	200	4,533,464	1,640,500
1862	London	171	6,211,103	2,360,000
1867	Paris	210	9,300,000	2,822,932
1873	Vienna	186	7,254,287	2,000,000
1876	Philadelphia	159	9,910,966	3,850,000

The Pennsylvania and Philadelphia appropriations not being liabilities, leave the net proceeds available for the reimbursement of the stockholders. The expenses were $1,830,000, so that if the Commission is not required to return the $1,500,000 contributed by the Government, the public spirited subscribers to the stock will have a large percentage of their contributions returned.

OHIO IN THE EXHIBITION.

Having thus briefly sketched the general history and results of the Exhibition; rather as matter for future reference than for present information, the Board come now to report upon matters in which they were more directly concerned, and the part which, under their supervision, was contributed by Ohio and her citizens in the general work.

On the 3d of July, 1876, the Board were deprived, by his resignation, of the services of Governor Hayes, who had been their Treasurer, and had greatly contributed by his intelligent and zealous assistance to the success of their work. The Hon. Ralph P. Buckland, of Fremont, was appointed to succeed him as a member of the Board and as its Treasurer.

During the summer, the Centennial Commissson extended invitations to the Governors of the several States to appoint an orator and name a day for his delivery of an address on the history, progress and resources of his State. Governor Hayes named the Hon. Edward D. Mansfield, LL.D., for this purpose, and that gentleman, on the 9th of August, delivered a carefully prepared address upon Ohio, of the character indicated, a copy of which will be found appended to this report.

The day for the delivery of some of these orations was also marked by a reception held by the Governor of the State, at the State Building, and it being found that the number of visitors on each of such "State days"

greatly exceeded that of any other day of the week in which the celebration occurred, a kind of generous rivalry was established to make the total attendance on a given State day as large as possible. Ohio visitors being always in attendance in large numbers, Governor Hayes was urged to hold a similar reception at the Ohio State Building, which was done on the 26th of October. The attendance on that day, known as Ohio Day, was 155,661, a larger number than on any other State day, excepting Pennsylvania day (September 28), and the 16th of October, the "day" of Maryland, Delaware and the District of Columbia, which was also the day for the very attractive Centennial National Riding Tournament.

During the Exhibition, visits of military organizations from the neighboring States became quite frequent, and in this respect Ohio was represented by the Cincinnati Light Guards and by the Columbus Cadets. The Light Guards marched all the way from Cincinnati to Philadelphia. The Columbus Cadets, under the command of Major Wade Converse, made their visit soon after that of the cadets from the United States Military Academy at West Point, and occupied the camp ground within the enclosure, which the latter had recently vacated. The drill, discipline, soldierly bearing and good conduct of the Ohio boys gave their friends no cause for regret that the time and circumstances of their visit naturally placed them in comparison with the well-trained cadets from West Point.

It is not too much to say that Ohio held a prominent place with the foremost States of the Union, in the exhibition of abounding evidence of her vast mineral resources, of the products of her soil, her mines and her workshops, of her educational system, with its means, processes and results, and of other proofs of her social and intellectual progress.

As it is impossible in this report to mention in detail the exhibits of individuals, a catalogue, believed to contain everything on exhibition from Ohio, is hereto attached. The more important collective exhibits from the State seem to require particular attention.

THE OHIO STATE BUILDING.

Early last winter, it had become so apparent that the Exhibition would attract a vast number of visitors, that many of the States, through their State Boards, began to take thought for the comfort and convenience of their own citizens, who it was supposed, would attend. The idea suggested itself to your Board that the erection of a house on the Centennial grounds would best accomplish the desired result. At the time this conclusion was reached, it was intended, in consequence of the small appropriation made for Centennial purposes, to erect something that would

merely serve as a shelter in case of necessity, but it was soon understood that many of the States designed putting up elaborate and handsome structures. Your Board determined that, if possible, Ohio should not be second to any of her sister States in providing, for those of her citizens who might visit the Exhibition, a respectable place of resort. An appeal was made to your honorable body, and you promptly and liberally responded by making an appropriation sufficient to carry out the design of the Board. At this time it was suggested that two objects could be accomplished: the erection of a building that would prove a comfortable resting place, and at the same time make an exhibition of one of the important natural resources of the State, by constructing the entire front, and the first story of twenty feet, of stone from leading quarries in the various sections of the State.

By the enterprise and liberality of the representatives of this interest, arrangements were made by which stone was to be furnished from thirty different quarries. That this was a work of some magnitude will be apparent when the conditions under which it was to be done are taken into consideration. It was late in January, 1876, when the appropriation was made. Detailed drawings of each of the twenty-one courses, and of the entire gable, were to be made and furnished to the several contributors; the stone to be dressed according to these details, transported to Philadelphia, and placed in the building, during a season of the year when the weather is usually unfavorable for out-door work. Notwithstanding all the difficulties in the way, the building was erected according to the original design of the architects, Messrs. Heard & Son, of Cleveland. It was finished for occupancy by the 20th of May, ten days after the opening of the Exhibition, being the second State building on the grounds ready for use.

The Board enjoy the satisfaction of having their expectations fully realized in the accomplishment of both the objects which they hoped to attain. As a place of resort for rest, for meeting friends, reading the leading Ohio papers, writing letters, and receiving mail matter, it was invaluable, and proved to be a means of comfort and usefulness that could hardly have been dispensed with. Registers were kept, in which Ohio visitors to the number of eighty thousand recorded their names and residences, but the attending numbers were so great that it was almost always difficult to get to the book, and probably not more than one-third of the names of Ohio visitors are recorded. The whole number of Ohio visitors to the exhibition is variously estimated at from two hundred and fifty thousand to three hundred thousand. By order of the Board, the three register books used have been deposited in the State Library

as the property of the State, forming a mammoth autograph album to which the advance of time will give an ever increasing interest.

That the State building accomplished the second object contemplated in its erection, the exhibition of the Ohio stone and other material entering into its construction, is evident from the fact that it was visited not only by the citizens of Ohio above mentioned, but by a much greater number of persons from other States, and from foreign countries, while its prominent position on the grounds, at the end of the row of State buildings, made it a noticeable building for a large majority of all the millions who attended the Exhibition during the six months of its duration. It was the general expression of those familiar with such matters, that it was the most durable and best constructed building on the grounds, and, by an overwhelming majority of those who saw it, it was conceded to be the handsomest and the best adapted for its purposes of all the State buildings.

One of the conditions on which the spaces on the grounds were allotted for the erection of the State buildings was, that within sixty days from the closing of the exhibition the buildings should be removed, and the grounds left in the same condition as before such occupancy of them. Before the close of the exhibition, the question arose with the Board as to the disposition to be made of the building when the exhibition was over. Should it be torn down, and the material sold for what it might bring? or, should the tender be made to have it retained as a monument of the resources of Ohio, and a memorial of the part taken in the celebration of the one hundredth anniversary of American independence by a State that did not exist until more than twenty-five years after independence was declared?

After due consideration and consultation with many citizens of the State, being fully satisfied that the interests of the State would be enhanced by procuring, if possible, the retention and maintenance of the building where it stood, the Board, at a meeting held on the 26th of October, 1876, unanimously passed the following:

Resolved, That the Secretary of this Board be directed to communicate to the Park Commissioners of the city of Philadelphia the desire of the Board to donate to the city the Ohio State building erected upon the park, if it is found consistent with the plans of the Park Commission for the improvement of the the park to maintain it in its present position.

This action of the Board was communicated to the Park Commission, who accepted the building by the following resolution, passed at their meeting on December 9, 1876:

Resolved, That the donation of the Ohio State building in the park be accepted, and that the thanks of the Park Commission be and are hereby extended to the Ohio State Board of Centennial Managers for their valuable gift.

Several others of the State buildings were tendered in like manner, but only the Ohio State building was accepted.

A description of the buildings, and a list of the contributors thereto, will be found in the catalogue hereto appended.

Two prize medals were awarded for the building—one for the variety and excellence of the stone used in the construction, its durability and its adaptation to the purpose for which it is employed; the other for the tasteful manner in which the stone, iron, glass, etc., resources of the State, were combined in and exhibited by the building.

OHIO MINERAL EXHIBIT.

The building-stone, clays, fire-brick, and pottery work, coals, iron ores, and iron-making materials, iron, salt, bromine, and other products of the mining and metallurgy of Ohio, were well repesented in a collection made under the direction of President Edward Orton, of the Ohio Agricultural and Mechanical College, of Columbus.

The specimens shown in this collection were accompanied by a geological map of Ohio, executed at the Agricultural and Mechanical College, under the direction of President Orton, with great accuracy, care, and skill, and on a very large scale. It showed not only the usual features of a geological map, but also complete sections of the strata in all the principal mineral regions of the State, as determined by the geological surveys. It also gave the location of nearly every working coal mine, ore bank, saline or petroleum well, and every iron furnace in the State.

The map, with the ores, thoroughly illustrated the wonderful capacity of Ohio for the production of iron. It showed a region embracing four thousand square miles, having a length of about two hundred miles, extending from the mouth of the Scioto River, in the south, to Trumbull county, in the north, with an average width of twenty miles—dotted over with more than one hundred furnaces, fifty-four rolling mills, and fifteen rail-mills. The ores, limestones, and iron of this region were fully represented, with the names and situations of the furnaces from which they were brought, showing the varied quality of the iron produced. No more thorough manifestation could have been desired to show the rank of Ohio as an iron producing State, next to Pennsylvania and above all others of the American States.

Besides the limestones used as fluxes in the manufacture of iron, specimens were shown of those quarried for building purposes, and for burning into lime. Lime from the principal kilns of the State was shown, accompanied in each case with its chemical analysis. Fire-clays, plastic and non-plastic, cement rocks, fire-sand, and other materials for the manu-

facture of fire-brick and brick for furnaces making Bessemer steel, were accompanied with analyses, and many specimens of such bricks, of pottery, etc.

The coal measures of Ohio occupy ten thousand square miles of territory, extending one hundred and eighty miles in length along the Ohio from Trumbull county, in the north, to near the mouth of the Scioto, in the south, with a maximum width of eighty miles. This great coal field has an average thickness of twenty feet of workable coal beds, and is estimated by E. D. Mansfield to contain one hundred and eighty thousand millions of tons of coal. This immense deposit of natural wealth was not only illustrated by the map, but made a marked and attractive feature of the mineral collection by its numerous specimens, accompanied with their analyses, statistics of the depth of strata, the annual production, and other material facts.

Some specimens of cannel coal from Licking county were exhibited. Columns of bituminous coal, representing the thickness of the veins, were exhibited from Pomeroy and Marietta. One large block of nearly three tons in weight, mined in the veins at Steubenville, at a depth below the surface of two hundred and twenty-five feet, was placed near another from Ferrara, in Perry county, which was in the form of a pillar twelve feet and eight inches in height and five feet square at the base, containing about eight tons. This was the largest specimen of bituminous coal on exhibition from the United States. It represented what is known as the great seam of the Hocking Valley, which for one hundred thousand acres has a thickness of eleven feet and upwards, and for a much greater extent a thickness of six feet and more.

These exhibits, with others from the Mahoning, Tuscarawas, and Hocking Valleys, from Leetonia, Cambridge, Macksburg, and other places, combined to give the visitors to the exhibition a better conception of the richness and extent of the vast deposits of fuel stored up in the coal measures of Ohio, than could be conveyed by any statement in figures.

The fitness of many of these coals for use in a raw state in the blast furnace was shown by the analyses which accompanied them; while specimens of coke made from others demonstrated their equal availability for the manufacture of iron when thus prepared.

In this collection were also building stones from about fifty quarries in all parts of the State, variously dressed to show their grain and quality, and carefully classed and marked to show the respective geological formations from which they were taken. Grindstones for all purposes were also shown, and compared favorably with any on exhibition.

Salt was presented from the principal saline works of the State, as

specimens of an important industry producing many millions of bushels annually; and bromine, made from the *bittern* or mother liquor of the salt wells, after the crystallizable salts are extracted. The latter product is peculiar to the saline regions of the Ohio Valley, which furnish more than half the bromine manufactured in the world; a large proportion being exported to foreign countries.

A specimen of pure carbon under the name of lampblack was also shown in this collection, and attracted attention from the peculiarity of its manufacture, being made by the burning of natural gas from a well bored in the search for petroleum.

This collection was well calculated to give visitors to the Exhibition an adequate idea of the mineral wealth of the State, and elicited the admiration of the jury of award, and in its extent, arrangement, and classification was unequaled.

MINERALS FROM THE MAHONING VALEY.

The Mahoning Valley Centennial Association was formed by representatives of the coal and iron interests of the Mahoning Valley, in Mahoning and Trumbull counties, Ohio. Youngstown, the commercial centre of this region, is midway between Cleveland and Pittsburgh, sixty-five miles from either, on the shortest route between the two cities. The association exhibted a collective representation of the industries of this region, accompanied by a very fine map, showing the geological character of the valley, its mines, furnaces and mills, and its facilities for transportation.

The Mahoning Valley contains fifty mines, producing the quality known as Briar Hill or block coal, which is so free from sulphur as to be advantageously used in its raw state for smelting iron ores, for which purpose it is extensively shipped to all regions on the lakes, using the ores of the Lake Superior region. The purity of this coal is so well and universally known as to make it a standard for comparison of other coals, and the ample specimens shown in great numbers at the Exhibition, taken from nearly all of its many mines, proved even to the careless observer, how well its reputation is deserved. At the close of the Exhibition, these specimens were in great demand, and many were carried away by exhibitors and scientists, not only to American States and Canada, but to Europe, South America and Australia.

Many specimens of Bessemer pig metal, made in the Mahoning Valley from Lake Superior ores, with Briar Hill coal, were shown, accompanied with their several analyses. Also specimens of the ores and the limestones used for fluxes, found in the valley. Besides these ores and irons, were exhibited numerous specimens of Black Band iron ores of this

region, both in the raw state and roasted, with many specimens of the iron made therefrom, which from its characteristic resemblance to the iron made in Scotland, bears the name of American Scotch iron. This product was abundantly shown in pigs, and as common boiled, merchant, bar-rolled and sheet-iron, etc. Twenty-one blast furnaces and thirteen rolling mills, all in active operation in this valley, were represented in their productions in this manner by the association.

A marked feature of this collection, was a curiosity to many thousands of visitors, and attracted marked attention through the whole time of the Exhibition. This was a large mass of Mineral Ridge coal and Black Band iron ore, taken as it lay in the mine, with this variety of the block coal above and attached to the stratum of iron ore beneath. This coal is mined and sold, and the ore, which contains within itself sufficient fuel for the purpose, is prepared by roasting for the blast furnace.

This whole exhibit was well designed to show the rich resources of the region it represented, as a great centre of coal and iron production of superior quality, with uncommon facilities for supplying the markets of a wide extent of country.

MINERALS FROM THE TUSCARAWAS VALLEY.

A collective exhibit was made of minerals and metallurgical products from the Tuscarawas Valley, and the line of the Marietta, Pittsburgh and Cleveland Railroad. It embraced numerous specimens of ores, coals, clays, limestones, etc., among which was a pillar of Black Band iron ore, seven feet and one inch high, taken from the ore pocket and exhibited in this manner to prove the thickness of the deposit. This specimen, weighing 8,930 pounds, was brought from the mines of A. Wilhelmi, at Stone creek, near Canal Dover, Tuscarawas county, now the property of the Tuscarawas Coal and Iron Company. The great thickness of this specimen, showing more than seven feet of ore, made it an object of wonder, especially to those familiar with the diminutive seams of similar ore in Scotland; and its dimensions, weight and analysis were carefully noted by many interested in such matters.

This exhibit also embraced a number of fine specimens of Massillon coals and iron from Massillon furnaces, fire-clay and fire-brick from Canal Dover, iron, iron ores, coals, limestones and clays from the Tuscarawas Coal and Iron Company, coals from the Macksburg, Cambridge and Marietta mines, mountain and kidney ores of iron. A costly glass case enclosed very fine specimens of various grades of American Scotch iron, made at Port Washington, Tuscarawas county, by the Glasgow-Port Washington Iron and Steel Company; also the materials from which the iron was made, Black Band iron ore, raw and roasted, limestone, coal, etc.

In this collection the Black Band Iron Company and the Ohio Coal Company of Marietta also exhibited black band, hematite and other iron ores from the former, and coal and coke from the latter.

MINERALS FROM THE HANGING ROCK REGION.

The exhibit of the Hanging Rock region of Ohio and Kentucky, collected by Messrs. Traber and Aubery, of Cincinnati, representing the Hanging Rock Centennial Association, showed the productions of a remarkable field of industry, which has its name from the village of Hanging Rock, on the Ohio river, where the commencement of its now widespread activity was made. The collection embraced the production of nearly one hundred furnaces and mills, in a region including about fourteen counties of Ohio and Kentucky, on both sides of and extending back from the Ohio river. Superior specimens of several varieties of iron were shown from the greater part of the furnaces in this region, embracing foundry and mill iron, cold-blast charcoal iron for car wheels and other purposes, hot-blast charcoal iron, iron made with raw stone-coal, and specimens of all the ores, cokes, coals and limestones used in the various manufactures.

Handsome exhibits of marbleized iron mantels, and specimens of marbleized iron of various shades and colors, manufactured at Cincinnati, completed the exhibit, which was accompanied by two well executed maps, showing respectively the counties in Ohio and Kentucky embraced in the Hanging Rock region.

The arrangement of this exhibit displayed much skill and taste, and was a remarkable example of success in making an attractive collection of materials by no means usually interesting to the general observer.

THE ARCHÆOLOGICAL EXHIBIT.

The State Archæological Association of Ohio made a very extensive display of relics of the Stone Age of Ohio, remains of the Mound Builders, Indian antiquities, pottery, etc., in sixteen large cases in the Mineral Annex to the Main Building. It was the aim of the Society to make this exhibit representative rather than extensive in its character, and the contents of the cases accordingly presented a marked variety. Many private collections exist in Ohio, each of which is nearly as large as was this collective exhibit. Many of these were carefully examined, and those objects which were deemed to be representative in character selected for the exhibit at the Centennial, which thus embodied the best and most instructive features of some forty-five separate museums of American antiquities. The painstaking care thus exercised must have

been amply rewarded by the admiration which the collection elicited from those interested in the study of the pre-historic races of America.

The copper implements in the collection were few in number, but of noticeable character. Those of flint and stone, and the flint, stone and bone ornaments, presented great variety of form and material, and were exceedingly numerous. Some pottery, of great interest to the archæologist, was shown, with a marked variety of sculptured stones, pipes and ornaments.

A series of charts was exhibited, showing several of the most interesting ancient earth-works and stone works found in the State; also, impressions taken from track rocks and rock shelters. All these illustrations showed careful surveying and skill in execution.

The whole exhibit was crowned with a very large historical and archæological map of Ohio, prepared with great skill and care at the Agricultural and Mechanical College, for the Archæological Society. This map gave the position of nearly all known ancient fortifications, mounds or earthworks in the State; the former habitat of the various tribes of Indians of Ohio; the routes of early explorations and military expeditions, and all that could be thus shown of historical and archæological interest.

This interesting exhibit bore abundant evidence that it was the result of much labor of love, guided by discriminative intelligence; and it reflected great credit upon the State Archæological Association, and the gentlemen who so courteously placed their private collections at the disposal of the Association for this purpose.

A more detailed report in regard to this collection, and the labors and views of the Archæological Society, has been made by a committee of its members, and will be found hereto appended.

CEREALS.

The Ohio cereal exhibit did not, perhaps, meet the expectations of many of the visitors from the State. There being less than one per cent. of the land surface of the State which is not susceptible of producing a tillage or other cultivated crop; the soil itself being second to none in the Union, so far as fertility is concerned, and the products or breadstuffs never descending in quality to the second rank in any of the markets, either foreign or domestic, it was natural that an imposing exhibit was to be expected from the State.

It is well known that, in consequence of excessive and continuous rains, the harvest of 1875 throughout the State was very defective; very little of it being secured in any other than a damaged condition. And it was from this harvest that the exhibit must be made—the harvest of 1876

would be entirely too late. It was, therefore, with the greatest reluctance that some farmers and others contributed to the Exhibition, basing their unwillingness on the inferior quality of their cereals, as compared with those of a normal or ordinarily good harvest. For the same reason, many absolutely refused to contribute; and some who undertook to make collections for exhibition failed to send anything.

Nevertheless, the samples of wheat, corn, and other cereals, prepared and exhibited by John H. Klippart, Secretary of the Ohio State Board of Agriculture, compared very favorably in quality with those from other States, and constant applications were made during the Exhibition for small quantities of various grains, corn especially. Many of the ears of corn measured from 9 to 12 inches in length, containing from 18 to 20 rows, and from 40 to 50 grains in the row.

When the harvest of 1876 was gathered, the exhibit was supplemented with a quantity of corn in the ear, and other cereals in stalk or straw, with specimens of grasses, which added to the effect and appearance of the exhibit, and served to give a more just idea of Ohio as an agricultural State.

WOOLS.

The exhibit of fine wools from Ohio was greater than that of any other State in the Union, and greater than that of any individual in the Union, except the exhibit of custom house samples by Mr. G. W. Bond, of Boston. One hundred and thirty samples of merino wool were contributed by wool growers of Harrison county alone; and Coshocton, Morgan and Licking counties were well represented.

The German and Austrian Commissioners very eagerly availed themselves of the opportunity to exchange samples from their respective countries for those of Ohio, expressing the opinion that a cross between the Ohio and their flocks would be very desirable; and the Austrian proposed to visit Ohio to investigate the details respecting our flocks and management.

FISH.

The Fish Commissioners of some eight or ten States gave promise of an exhibition of live fish from their respective States. No State except our own made an exhibit of fresh-water fish, and two States only of marine fish. Several States shipped exhibits of live fresh-water fish, but none arrived alive except those from Ohio. The Ohio fish were shipped in a tank especially constructed, and of the capacity of three hundred and thirty gallons. Into this tank an aggregate of eighty-six fish, representatives of twenty-eight species from the Scioto river were placed; and men were employed to aerate the water incessantly, day and

night, from the time of leaving Columbus until the arrival at Philadelphia—a period of four days. The trip was accomplished with a single change of water on the route, and the loss of two fish. Arrived at their destination, and placed in the aquariums provided for them, they formed a large part of one of the most interesting and attractive features of the Exhibition.

Plaster casts of Ohio fish were also exhibited; and a very complete collection of the lake and river fish of Ohio, prepared and mounted with great skill and success under the auspices of the Cuvier Club, of Cincinnati, divided with the live fish the attentive study and admiration of ichthyologists, and left nothing wanting to a complete exposition of the resources of Ohio in this important supply of human food.

POMOLOGY.

The pomological exhibition at the Centennial was held in the month of September. Here Ohio was represented by a collective exhibit prepared by the State Horticultural Society, under the management of Dr. Warder, President, and M. B. Bateman, Secretary, and fully sustained her reputation as a leading fruit-producing State. Eleven hundred plaster specimens, contributed from twenty-four counties in all parts of the State, were shown by the society. They embraced every known and approved variety of apples, pears, peaches, grapes, etc., obtainable at that season of the year, the specimens being profuse in quantity, unsurpassed in size, and unexcelled in flavor and quality. Dr. Warder also made a very handsome exhibition of some fifty varieties of early apples, which was much admired. The excellent arrangement by the exhibiters was worthy of the occasion and of the excellence of the fruits displayed; and probably no prize medal awarded was better deserved than that which recognized the high place taken by this exhibit in the estimation of all who saw it.

LIVE STOCK.

The Centennial Commission arranged for a series of displays of various kinds of live stock, to be made at stated periods during the exhibition. For a time it was expected that considerable contributions to these would be made from the stables, herds, and flocks of Ohio; but though many of our stock breeders were quite willing to incur the very considerable expense of transportation and care, they were loth to risk the loss of their prized animals, especially as the summer proved unusually hot. The same cause operated in other States, and these exhibitions were limited chiefly to animals from the neighborhood, and others seeking a market. But three Ohio horses were shown, and none of the widely celebrated cattle of the State. One exhibiter had a few very superior fine-wooled

sheep, and four others showed excellent specimens of the most approved breeds of swine. Some prize poultry was also exhibited. The great merit of the few animals brought from Ohio made the absence of a fair display of her live stock to be regretted, though the cause was well understood and almost unavoidable.

ARTISTIC CARVING AND PAINTING IN PORCELAIN.

A potent aid to the Centennial Commission was the Women's Centennial Association, which not only gave important assistance in securing subscriptions to the general stock, but erected, at a cost of thirty-five thousand dollars, the Woman's Pavilion, a very fine building in which to exhibit the products of woman's work. One of Ohio's daughters was the efficient Vice-President of the Women's Commission, and the ladies of Ohio nobly seconded her efforts, and more than maintained the reputation of the State by furnishing for exhibition a larger proportion of articles, both useful and ornamental, than those of any other State.

In the Woman's Pavilion, and one of its most prominent and admired features, was shown the collective exhibit of artistic carving, painting on china, etc., the work of the ladies of the School of Design of the University of Cincinnati, and other ladies of Ohio, prepared under the auspices of the Women's Centennial Executive Committee of Cincinnati. A list of the contributors and the articles of their production will be found set forth in the general catalogue hereto appended, which will give some idea of the extent and variety of the collection. A catalogue enumeration, however, entirely fails to convey any impression of the exceeding beauty of design and skill in execution, which characterized these highly artistic productions, and won for them the admiration of the visitors and an award from the judges. They compared very favorably, indeed, with any similar productions in the exhibition, and gave ample evidence of satisfactory progress in comparatively new but exceedingly important branches of industrial art in America.

EDUCATIONAL EXHIBIT.

A well conceived and exhaustive showing of the whole system of education of the State, was skillfully and tastefully displayed in one of the galleries of the main building, where it made a very attractive exhibition in itself. The whole school statistics of the State were embodied in a series of comprehensive charts. Crayon drawings and artistic designs of various kinds, executed by pupils, and very numerous photographic views of the colleges and school buildings of the State, also embellished the apartment, and portrayed the progress of Ohio in these branches of art.

education and school architecture, as well as the fostering care of her school officials for the health, comfort, and convenience of the teachers and pupils.

All legislation for school purposes was collated, from State laws down to merely local enactments, and the system of grading in the public schools was fully shown. Historical sketches were given of the schools of all the large cities and towns, of every collegiate institution, and of every benevolent and reformatory institution in the State, in the conduct of which education in any sense formed a part. Handsomely and uniformly bound volumes of examination manuscripts from the several grades of the public schools in all the cities and nearly all the large towns, gave accurate testimony to the nature and extent of the work of public instruction and its actual results.

This collection proved so interesting and valuable that it has been deemed worthy of preservation in its entirety, and will be kept for public inspection and reference in the office of the State Superintendent of Education in the State Capitol. A more detailed account of the educational exhibit has been made by a committee appointed for that purpose, and will be found annexed to this report.

OHIO EXHIBITS IN GENERAL.

In the catalogue and the list of awards received by Ohio exhibitors, annexed to this report, it will appear that in every department of the great exhibition, Ohio was well and fully represented. Her manufactures of iron and other productions of metallurgy were conspicuous for their numbers and great merit. Her productions of chemistry in some cases had no competitors, and in all others ranked with the best. Her articles of food and sustenance, provisions, breadstuffs, cheese, wines, malt liquors, etc., and the materials for raiment—wool, flax, leather, etc.—attested the varied character of her agricultural products, and their quality as second to those of no other State. Her furniture and objects of general use in the construction and adornment of dwellings and in every day life evinced skilled workmanship in every case, frequently combined with a marked development of artistic taste in design and ornamentation. Her agricultural machinery, profusely contributed from all parts of the State, formed a large proportion of the vast and unprecedented display in Agricultural Hall, and elicited the astonishment as well as the admiration of all beholders. Outside the buildings at the Centennial the visitors every where encountered evidences of the skill and enterprise of Ohio manufacturers. Here a large building erected to display the stove manufacture of a single Ohio firm; there another, in

the form of a handsome pavilion, made of the metal whose manufacture it at once exhibited and advertised. One of the large and deep ravines on the beautiful grounds was spanned by an iron bridge of Ohio manufacture, combining a light and graceful appearance with great strength; while engine-builders and boiler-makers of Ohio contributed their full share to the motive power which served to exhibit machinery in motion.

And over all, thoughtful for the smallest detail of personal comfort and enjoyment of the visitor, as well as for the interest and satisfaction of every exhibiter, the directing mind of the whole organization, carrying the Centennial forward from its beginning to its close, crowned with success, was a citizen of Ohio, Mr. Alfred T. Goshorn, the Director General of the Exhibition.

At the last meeting of the Board the following resolution was adopted:

Resolved, That the thanks of this Board are due and hereby tendered to Hon. F. W. Green, Assistant Secretary of the Board, for the diligent, faithful, and satisfactory manner in which he has performed his duties as such Secretary.

The following statement shows the receipts and disbursements from the organization of the Board:

Amount appropriated in 1874	$5,000 00
" " 1875	7,500 00
" " 1876	25,000 00
" " " educational	8,000 00
" received from other sources	231 85
Total recei ts	$45,731 85
Amount paid out	40,418 33
Balance unexpended	$5,313 52

The above balance is accounted for as follows:

Amount in State Treasury	$4,500 00
Amount in hands of R. P. Buckland, Treasurer	813 52
Total	$5,313 52.

Respectfully submitted,

R. P. RANNEY,
E. F. NOYES,
G. W. MCCOOK,
B. BURNS,
R. P. BUCKLAND.

Attest: F. W. GREEN, *Assistant Secretary.*

CATALOGUE OF EXHIBITS FROM THE STATE OF OHIO.

OHIO STATE BUILDING.

[HEARD & SONS, CLEVELAND, OHIO, ARCHITECTS.]

The Ohio State Building is located on the Centennial grounds in Fairmount Park, on the corner of Belmont and State avenues. The building is from designs prepared by Heard & Sons, Architects, of Cleveland, Ohio. The main building is forty-four feet square and two stories high. It contains, on the west side, two ladies' parlors, with dressing-rooms attached In the center is a hall nine feet wide. The east side contains an office and a writing-room. In its rear is a building thirty by sixty feet, used as a reading-room and for holding meetings. A porch ten feet wide extends the entire length of the back building. The stone for the building was furnished from Ohio quarries, some thirty different quarries being represented. The roofing, glass, and furniture were also furnished by Ohio manufacturers. The contributors to the building and its preparation for the Exhibition are set forth in the following list:

Berea Stone Co., Berea, courses 1 and 2, Berea stone.

O. D. Ford, Cleveland, course 3, Euclid stone.

J. R. Hurst, Cleveland, course 4, Independence stone.

L. Haldeman & Son, Cleveland, course 5, window and corner, Amherst stone.

John Wagner, Cleveland, course 6, Independence stone.

Amherst Stone Co., Cleveland, course 7, Amherst stone.

Black River Stone Co , Cleveland, course 8, window and corner, Black River stone.

John Paul & Co., Massillon, course 9, Massillon white stone.

Wilson & Hughes Stone Co., Cleveland, course 10, window and corner, Amherst stone.

Clough Stone Co., Amherst, course 11, and one-half of front entrance, Amherst stone.

Worthington & Sons, Amherst, course 12, and one-half of front entrance, Amherst stone.

Ohio Stone Co., Cleveland, course 13, Amherst stone.

J. McDermott & Co., Cleveland, course 14, window and corner, Berea stone.

Cosho ton Stone Co., Coshocton, course 15, window and corner, Coshocton stone.

Stitt, Price & Co., Columbus, course 16, Columbus limestone.

Wm. Huffman and others, Springfield, cours› 17, Springfield limestone.

J. H. Finigan, Cincinnati, course 18, Buena Vista stone.

M. Finnigan, Cincinnati, one window, Buena Vista stone.

Wilson & Hughes Stone Co., Cleveland, course 19, Independence stone.

R. M. Montgomery, Caldwell & Tod, Byers & McIlhaney, Mauser & Haid, Homer Hamilton, Youngstown, course 20, Mahoning county stone.

Warthorst & Co., Massillon, course 21, Massillon red stone.

Marcus Bosler, William Huffman, Dayton, Dayton limestone for entire gable front, and for three windows.

State Board, one window, Independence stone.

M. F. Richey, Waverly, one window, Waverly stone.

Z. S. Stocking, Mansfield, two vestibule windows, Mansfield variegated stone.

W. G. McNally, Cleveland, coat of arms, carved in Berea, stone furnished by Berea Stone Co.

Buvinger Bros., Dayton, galvanized iron coat of arms of Ohio.

American Sheet and Boiler Plate Co., Cleveland, sections of corrugated and metallic tile roofing.

Garry Iron Roofing Co., Cleveland, sections of iron roofing, painted with iron clad paint.

Kittredge Cornice and Ornamental Co., Salem, Galvanized iron work.

House & Davidson, Cleveland, pair of front doors.

Diamond Glass Co., Ravenna, plate glass, manufactured from ground sandstone.

Champion Fence Co., Kenton, fence and gates in front of building.

The following articles were furnished for use within the building:

Myers, Uhl & Co., Cleveland, marble mantel and Peerless grate in the ladies' parlor.

Marchand & Son, Cleveland, chandelier in ladies' parlor.

Ohio Valley Piano Co., Ripley, grand piano in ladies' parlor.

Mason & Hamlin Organ Co., organ in ladies' parlor.

Laughlin Bros., East Liverpool, specimens of ornamented stone china.

C. C. Chadwick, Columbus, Wooton desk in the office.

Delaware Chair Co., Delaware, rocking and arm chairs.

Mrs. C. H. Sterling, Gambier, water color painting.

J. F. Ryder, Cleveland, portraits of survivors of Battle of Lake Erie, frame of the wood of the flagship Perry; also, chromo of Willard's "Yankee Doodle."

Samuel Stryker, Tiffin, Masonic apron formerly belonging to General Washington.

Stebbins & Co., Toledo, State and county maps.

Kittredge Cornice and Ornament Co., Salem, galvanized iron ornaments.

John Grossius, Cincinnati, school-house ventilating stove.

The Algretti Refrigerator Co., New York, the Antiseptic refrigerator.

Dr. D. B. Sturgeon, Toledo, American depurator bath.

Robison, Savage & Co., Cleveland, three Russia full bound registers for Ohio visitors.

Edward Orton, President of Agricultural and Mechanical College, Columbus, geological map of Ohio.

Hon. J. M. Dalzell, Caldwell, Ohio, portrait and life of John Gray, revolutionary soldier, who died in 1868, aged 104 years.

MAIN BUILDING AND ANNEXES.

MINING AND METALLURGY, AND WORKING IN METALS, ETC.

Cleveland Rolling Mill Co., Cleveland, pig metals, bars, etc., of iron and Bessemer or Siemen-Martin steel.

Otis Iron and Steel Co., Cleveland, ingots, bars, plates, and forgings of Siemen-Martin steel.

American Sheet and Boiler Plate Co., Cleveland, plate, sheet, corrugated, galvanized, metallic tile, universal plate and agricultural iron, Bessemer and Siemen-Martin steel.

United States Corrugated Elbow Co., Cincinnati, stove-pipe elbow machine, stove-pipe elbows.

Rhodes & Co., Cleveland, Bessemer car-wheel and malleable charcoal iron.

Joseph Zilhmann, Bellaire, mould for shaping blown glass.

Cleveland Malleable Iron Co., Cleveland, malleable iron castings and tackle blocks, fifth wheels, etc.

King Iron Bridge and Manufacturing Co., Cleveland, wrought iron highway bridge between the horticultural hall and the art gallery.

Hanging Rock Region.

Vesuvius Furnace, Etna Iron Works, Ironton, iron ores.
Etna Furnace, Etna Iron Co., Hanging Rock, iron ores.
Hecla Iron and Mining Co., Ironton, iron ores.
Monitor Furnace Co., Ironton, iron ores.
Grant Furnace Co., W. D. Kelley & Co., Ironton, iron ores.
Center Furnace, W. D. Kelley & Co., Ironton, iron ores.
Howard Furnace, Charcoal Iron Co., Ironton, iron ores.
Buckhorn Furnace, Charcoal Iron Co., Ironton, iron ores.
Olive Furnace, Campbell, McGugin & Co., Ironton, iron ores.
Lawrence Furnace Co., Ironton, iron ores.
Pine Grove Furnace, Means, Kyle & Co., Hanging Rock, iron ores.
Ohio Furnace Co., Means, Kyle & Co., Hanging Rock, iron ores.

Washington Furnace, Union Iron Co., Portsmouth, iron ores.
Scioto Furnace, L. C. Robinson & Co., Portsmouth, iron ores.
Bloom Furnace, John Paul & Co., Portsmouth, iron ores.
Clinton Furnace, W. I. Bell, Wheelersburg, iron ores.
Buckeye Furnace Co., Jackson, iron ores.
Cambria Furnace, D. Lewis & Co., Samsonville, iron ores.
Jackson Furnace, L. P. N. Smith's heirs, Sciotoville, iron ores.
Jefferson Furnace Co., Oak Hill, iron ores.
Orange Furnace, Orange Iron Co., Jackson, iron ores.
Star Furnace Co,, Jackson, iron ores.
Huron Furnace, Huron Iron Co., Jackson, iron ores.
Tropic Furnace Co., Jackson, iron ores.
Globe Furnace Co., Globe Iron Co., Jackson, iron ores.
Fulton Furnace, Globe Iron Co., Jackson, iron ores.
Wellston Twin Furnace, Wellston Coal and Iron Co., Wellston, iron ores.
Lincoln Furnace, I. M. McGhee's estate, Reed's Mills, iron ores.
Richland Furnace Co., Richland, iron ores.
Eagle Furnace, L. C. Damarin & Co., Reed's Mills, iron ores.
Hope Furnace, L. C. Damarin & Co., Portsmouth, iron ores.
Hampden Furnace, L. C. Damarin & Co., Portsmouth, iron ores.
Vinton Furnace, Bancroft, Rader & Co., Vinton Station, iron ores.
Keystone Furnace Co., Portsmouth, iron ores.
Monroe Furnace, Union Co., Portsmouth, iron ores.
Latrobe Furnace, Bundy & Cobb, Berlin Cross Roads, iron ores.
Logan Furnace, Logan county, iron ores.
Union Furnace, Brooks & Houston, Haydensville, iron ores.
Gallia Furnace, Norton, Campbell & Co., Portsmouth, iron ores.
Hanging Rock Iron Region, Ironton, pig iron, with articles manufactured therefrom; also iron ores.
Traber & Aubery, Cincinnati, iron ores from twenty-five States and territories.
Traber & Aubery, Cincinnati, broken car wheels, chill-tests, etc.
Ironton Furnace, Iron and Steel Co., Ironton, iron ores and bituminous coals.
Gallia Furnace, Portsmouth, pig-iron, hot-blast charcoal iron.
Belfont Furnace, Belfont Iron Works, Ironton, iron ores and bituminous coal.
Ophir Furnace Co., Jackson, iron ores, and Jackson county stone coal.
Hanging Rock Iron Region Furnace, Ironton, iron ores, cinders, bituminous coals, etc.
Mount Vernon Furnace, Hiram, iron ores, bituminous coal, limestone, etc.
Milton Furnace and Coal Co., Wellston, iron ores and bituminous coal, fire-clay, etc.
Vesuvius Furnace, Etna Iron Works, Ironton, pig-iron and cold-blast charcoal car-wheel iron.
Etna Furnace, Etna Iron Co., Hanging Rock, pig-iron, and cold-blast charcoal car-wheel iron.
Alice Furnace, Etna Iron Works, Hanging Rock, Whitwell ovens and Ferry process.
Blanche Furnace, Etna Iron Works, Ironton, pig-iron, Whitwell hot-blast and Ferry process.
Hecla Iron and Mining Co., Ironton, pig-iron, and cold-blast charcoal car-wheel iron.
Monitor Furnace Co., Ironton, pig-iron, and cold-blast charcoal car-wheel iron.
Mount Vernon Furnace, Hiram, Ironton, pig-iron, hot-blast charcoal foundry iron.
Grant Furnace, W. D. Kelley & Sons, Ironton, pig-iron, hot-blast charcoal iron.

Center Furnace, W. D. Kelley & Sons, Ironton, pig-iron, hot-blast charcoal iron.
Howard Furnace, Charcoal Iron Co., Ironton, pig-iron, hot-blast charcoal iron.
Buckhorn Furnace, Charcoal Iron Co., Ironton, pig-iron, hot-blast charcoal iron.
Olive Furnace, Campbell, McGugin & Co., Ironton, pig-iron, hot-blast charcoal iron.
Lawrence Furnace Co., Ironton, pig-iron, hot-blast charcoal iron.
Pine Grove Furnace, Means, Kyle & Co., Hanging Rock, hot-blast charcoal iron.
Ohio Furnace, Means, Kyle & Co., Hanging Rock, hot-blast charcoal iron.
Iron Furnace, Iron and Steel Co., Ironton, pig-iron, Player hot-blast.
Belfont Iron Works, Ironton, pig-iron, Player hot-blast.
Washington Furnace, Union Iron Co., Portsmouth, pig-iron, hot-blast charcoal iron.
Scioto Furnace, L. P. Robinson & Co., Portsmouth, pig-iron, hot-blast charcoal iron.
Bloom Furnace, John Paul & Co., Portsmouth, pig-iron, hot-blast charcoal iron.
Clinton Furnace, W. I. Bell, Wheelersburg, pig-iron, hot-blast charcoal iron.
Buckeye Furnace Co., Jackson, pig-iron, hot-blast charcoal iron.
Cambria Furnace, D. Lewis & Co., Samsonville, pig-iron, hot-blast charcoal iron.
Jackson Furnace, L. P. N. Smith's heirs, Sciotoville, pig-iron, hot-blast charcoal iron.
Jefferson Furnace Co., Oak Hill, pig-iron, cold-blast charcoal car-wheel and machinery iron.
Orange Iron Co., Jackson, pig-iron, hot-blast Jackson county stone-coal iron.
Star Furnace Co., Jackson, pig-iron, hot-blast Jackson county stone-coal iron.
Huron Iron Co., Jackson, pig-iron, hot-blast Jackson county stone-coal iron.
Tropic Furnace Co., Jackson, pig-iron, hot-blast Jackson county stone-coal iron.
Globe Iron Co., Jackson, pig-iron, hot-blast Jackson county stone-coal iron.
Fulton Furnace Co., Jackson, pig-iron, hot-blast Jackson county stone-coal iron.
Ophir Furnace Co., Jackson, hot-blast pig-iron.
Milton Furnace and Coal Co., Wellston, pig-iron, Jackson county softener iron.
Wellston Coal and Iron Co., Wellston, pig-iron, Jackson county stone-coal iron.
Lincoln Furnace, J. M. McGhee's estate, Reed's Mills, pig-iron, cold-blast charcoal iron.
Eagle Furnace, L. C. Damarin & Co., Reed's Mills, pig-iron, hot-blast charcoal iron.
Richland Furnace Co., Richland P. O., pig-iron, hot-blast charcoal iron.
Hope Furnace, L. C. Damarin & Co., Portsmouth, pig-iron, hot-blast charcoal iron.
Hampden Furnace, L. C. Damarin & Co., Portsmouth, pig-iron, hot-blast charcoal iron.
Vinton Furnace, Bancroft, Rader & Co., Vinton Station, pig-iron, hot-blast bituminous coal and coke irons.
Keystone Furnace Co., Portsmouth, pig-iron, hot-blast charcoal iron.
Monroe Furnace, Union Iron Co., Portsmouth, pig-iron, hot-blast charcoal iron.
Latrobe Furnace, Bundy & Cobb, Berlin Cross Roads, pig-iron, hot-blast charcoal iron.
Logan Furnace Co., Logan county, pig-iron, hot-blast charcoal iron.
Union Furnace, Brooks & Houston, Haydensville, pig-iron, hot-blast charcool iron.

Mahoning Valley.

Mahoning Valley Centennial Association, Youngstown, ores, coal, and limestone, Bessemer iron and manufactured iron.
Himrod Furnace Co., Youngstown, Bessemer and foundry pig-iron.
Andrews & Hitchcock, Youngstown, Scotch foundry and pig-iron.
Ohlton Coal Co., Youngstown, black-band iron ore, with coal.
Foster Coal Co., Youngstown, coal.
Kyle Coal Co., Youngstown, coal.

Church Hill Coal Co., Youngstown, Brier Hill coal.

Andrews & Hitchcock, Youngstown, Brier Hill coal.

Andrews, Hitchcock & Co., Cleveland, Lake Superior iron ores, merchant, bar, and sheet iron, limestone, Brier Hill coal.

Andrews Brothers, Youngstown, Bessemer, foundry, and mill pig-iron.

Youngstown Rolling-Mills, Youngstown, horseshoe, bar, hoop, and band iron; steel mixed with iron.

Wick, Ridgway & Co., Youngstown, railroad iron of all sizes.

Brown, Bonnell & Co., Youngstown, pig, bar, and sheet iron.

Cartwright, McCurdy & Co., Youngstown, hoop, band, and horseshoe iron and steel.

Struthers Iron Co., Youngstown, Bessemer, foundry, and gray forge iron.

L. B. Ward, Niles, iron, Mineral Ridge coal, and black-band iron ore.

Arms, Bell & Co., Youngstown, bolts, nuts, and washers.

Brier Hill Iron and Coal Co., pig-iron of various grades.

Harris, Maurer & Co., Mineral Ridge, calcined black-band iron ore.

Halliday Coal Co., Youngstown, Brier Hill coal.

Vienna Coal Co, Youngstown, Brier Hill coal.

Mahoning Coal Co., Youngstown, Brier Hill coal.

Burnett Coal Co., Youngstown, Brier Hill coal.

Jonathan Warner, Mineral Ridge, Scotch pig-iron.

Girard Rolling-Mill Co., Girard, bar-iron.

Tuscarawas Valley.

Black-Band Iron Co., Marietta, black-band, red hematite, and other iron ores.

Dover Fire-Brick Co., Canal Dover, fire-clay and fire-brick.

Glasgow-Port Washington Iron and Steel Co., Port Washington, pig-iron, ores, and coals.

Tuscarawas Coal and Iron Co., Cleveland, iron ores, coas, limestone, and clay.

J. P. Burton, Massillon, iron from Massillon Furnace, and coal.

John T. Warwick, Massillon, coal from Warmington mine.

Anthony Howells, Massillon, coal from Pigeon Run.

Miscellaneous.

W. B. Brooks & Co., Columbus, Hocking coal.

Newark Coal Co., Newark, cannel coal.

Lawton, Burnett & Co., East Palestine, coal from Columbiana county.

James C. Blauvelt, Marietta, pillar of coal from Marietta.

Hurd Coal and Iron Co., Columbus, pillar of coal from Ferrara, Perry county, 12 feet 8 inches high, 5 feet square, weight 15,360 pounds.

P. Hayden, Columbus, coal from Hocking county.

Steubenville Coal Co., Steubenville, block of coal from Steubenville, block of sandstone.

Pomeroy Coal Co., Pomeroy, pillar of coal.

Ohio River Salt Co, Pomeroy, jars of fine and dairy salt.

Central Ohio Salt Co., Columbus, jars of fine and dairy salt from Athens and Hocking counties, and pork packers' salt.

Kokosing Oil Co., Gambier, lampblack made from natural gas by process patented by Peter Neff.

J. Park Alexander, Akron, fire-brick, stoneware, fire-clays, fire-sand, etc.

Scioto Fire-Brick Co., Sciotoville, fire-brick and clay.

Wassall Fire-Clay Co., Columbus, dentist's furnace, terra cotta ware, fire-brick, and clay.

Marietta, Pittsburgh and Cleveland Railway, Marietta, column of blackband iron ore from mines of A. Wilhelmi, Stone Creek, Tuscarawas county, 7 feet 1 inch high, weight 8,930 pounds; Cambridge coal from Guernsey county; Macksburg coal, iron ores, limestone, fire-clay.

Ohio Coal Co., Marietta, coal and coke.

Rhodes & Co., Cleveland, Lake Superior ores and coal.

Cherry Valley Iron Co., Leetonia, coal, coke, iron ore, limestone, and iron.

Ohio Agricultural and Mechanical College, Columbus, comparative exhibit of iron, iron ores, and other iron-making materials from the various furnaces of Ohio.

COLLECTIVE EXHIBIT OF BUILDING STONE, ETC.

Ohio Agricultural and Mechanical College, Columbus, specimens of Ohio building stone, and geological assignment of the various exhibits of such stone.

Peninsula Stone Co., Peninsula, building stones.

G. S. Innis, Warden of Ohio Penitentiary, Columbus, limestone from State quarries at Columbus.

Forest City Stone Co., Cleveland, sawed stone flagging.

M. Finigan, Cincinnati, Buena Vista stone.

W. Fish & Sons, Columbus, stone from Portsmouth and Black Lick.

Marcus Bosler, Dayton, limestone.

E. T. Brown, Commander at Soldiers' Home, Dayton, stone from quarries on the grounds of the National Soldiers' Home.

Charles B. Wells, Marietta, sandstone for building purposes, and grindstones, wet and dry, mechanics', saw, plow, and axe.

D. C. Statler, Piqua, building stone, limestone, and lime.

Lewis Face, Covington, building stone, limestone, and lime.

John Paul & Co., Massillon, stone for building and glass manufacturing.

Wm. S. Thompson, Springfield, building stone, limestone, and lime slacked and unslacked.

Jacob Traber, Cincinnati, limestone.

John M. Mueller, Cincinnati, Buena Vista stone.

Morris F. Richey, Waverly, building stone.

Amherst Stone Co., Cleveland, blocks of sandstone, worked stone, etc.; also grindstones on platform of mineral annex.

Warthorst & Co., Massillon, blocks of sandstone and grindstones.

Berea Stone Co., Berea, building stone.

Worthington & Sons, North Amherst, Amherst building stone, grindstones from quarries at Amherst and Lake Huron, Michigan.

Charles Carpenter, Kelley's Island, glaciated surfaces of limestone.

D. S. Irwin, Cedarville, building stone, limestone, and lime.

George Sintz, Springfield, limestone and lime.

U. S. Soapstone Manufacturing Co., Cincinnati, steatite.

Marsh & Co., Sandusky, gypsum.

Columbus State Quarry, Columbus, limestone.

Coshocton Stone Co., Coshocton, sandstone.

J. McLain Smith, Dayton, Ludlow marble.

J. McDermott & Co., Cleveland, Berea sandstone.

Clark's Quarries, Delphos, sandstone and marble.
Mathews & Zeppernick, New Lisbon, sandstone.
Wolf's Quarry, Akron, building stone.
John Grist, Lowell, limestone.
Clough Stone Co., Amherst, sandstone.
Wilson and Hughes Stone Co., Cleveland, table, column, and blocks of sandstone.
C. Daugherty, Newark, fine-grained sandstone, coarse-grained sandstone.
Tuscarawas Coal and Iron Co., Zoar, sandstone.
Black River Stone Co , Grafton, sandstone.
Barnabas Burns, Mansfield, variegated sandstone.
Stitt, Price & Co., Columbus, limestone and lime.
Pomeroy Bromine Works, John J. Juhler, Pomeroy, bromine.
G. F. Rucker & Sons, Greenfield, building stone.

EDUCATIONAL EXHIBIT OF THE STATE OF OHIO, IN THE SOUTH GALLERY OF THE MAIN BUILDING.

Education in Ohio, embracing school legislation, ungraded schools, graded schools, high schools and academies, higher education, normal schools, teachers' institute, school supervision, teachers' association, education in the penal, reformatory, and benevolent institutions, biographical sketches, educational periodicals.

Historical sketches of the schools of Ohio, including Akron public schools, Barnesville public schools, Beverly public schools, Bucyrus public schools, Cambridge public schools, Canton public schools, Canal Fulton public sch ols, Cincinnati public schools, Cincinnati high schools, Circleville public schools, Columbus public schools, Dayton schools, Defiance public schools, Ereble les primitive school-house, Eaton public schools, Elyria schools, Findlay schools, Fremont public schools, Garretsville union sch ols, educational progress of Hamilton, Hillsborough public schools, Ironton public schools, Lancaster public schools, Lebanon common schools, Marysville common schools, Massillon union schools, Middletown common schools, Newark public schools, New Lisbon public schools, New London special schools, Norwalk public schools, Oberlin public schools, Orrville graded schools, Painesville public schools, Piqua public schools, Portsmouth public schools, Ripley public schools, Salem public schools, Sandusky public schools, Steubenville public schools, Toledo public schools, Troy public schools, Wapakoneta public schools, Waverly public schools, Xenia public schools, Youngstown public schools, Zanesville public schools.

Historical sketches of the higher educational institutions, etc., of Ohio, including Antioch College, Baldwin University, Cleveland Academy, Cleveland Female Seminary, Clermont Academy, Cincinnati Wesleyan College, Denison University, Grand River Institute, Heidelberg College, Hillsborough Female College, Hiram College, Kenyon College, Lake Erie Female Seminary, Marietta College, Mt. Union College, North-Western Ohio Normal School, Ohio Agricultural and Mechanical College, Oberlin College, Ohio Central Normal School, Ohio University, Ohio Wesleyan Female College, Ohio Wesleyan University, Otterbein University, Steubenville Female Seminary, St. Xavier College, Twinsburgh Institute, Western Reserve College, Wittemberg College, Wilberforce University, Van Sickle's Business College, and the following named benevolent and reformatory institutions: Ohio Institut on for the Education of the Blind, Ohio Institution for the education of the Deaf and Dumb, Ohio State Asylum for the Education of Idiotic and Imbecile Youth, Ohio Soldiers' and Sailors' Orphans' Home, Western Ohio Hospital for

the Insane, Ohio Girls' Industrial Home, Ohio Reform Farm School, Ohio Penitentiary, Private Benevolent Institutions, Cincinnati Orphans' Asylum, Jewish Orphans' Asylum, Widows' Home.

Photographs of school buildings, drawings, and bound volumes of examination manuscripts from the several grades of schools of Cincinnati, Cleveland, Columbus, Canton, Dayton, Eaton, Elyria, Fremont, Ironton, Lancaster, Oberlin, Ottawa, Portsmouth, Sandusky, Steubenville, Toledo, and Xenia.

From the School of Design of Cincinnati University (crayon drawings from cast), Laocoon, Venus de Milo, Discobulus, Venus de Medici (two), Flute Player, Fighting Gladiators (two), original design, crayon, The Fugitive Slave; also designs for frescoes, illuminations, panels, etc.

College Views, Plats, etc.

Agricultural and Mechanical College, Ohio, plat of grounds.

Antioch College, lithograph of buildings.

Cincinnati Wesleyan Female College, lithograph of building.

Cleveland Female Seminary, photograph of building.

Hiram College, cut of building and plat of grounds.

Kenyon College, seven photographic views of buildings and grounds, also plat of grounds, and thirteen photographs of presidents and professors.

Oberlin College, five photographs of buildings and six photographs of presidents and professors.

Ohio University, view of buildings and grounds, and an engraved likeness of Manasseh Cutler and of Thomas Ewing.

Ohio Wesleyan University, photograph of building and plat of grounds.

Otterbein University, two views of the buildings and grounds.

Urbana University, plat of grounds and portfolio of students' work.

Wilberforce University, one portfolio of drawings.

Wittemberg College, photographic views of the building.

Common school buildings—

Bucyrus, two photographic views.

Circleville, four photographic views.

Findlay, one photographic view.

Piqua, three views of school buildings.

Ravenna, one view of school buildings.

Troy, two views of school buildings.

Smithville, one view of school building.

Newspapers of Ohio, four volumes.

Charts illustrative of the condition and progress of the public schools, showing the relative number of pupils in each branch of study taught, year ending August 31, 1874; comparative number of boys and girls, white and colored, and the enrollment and attendance of the same; average number of pupils in attendance to each school room, year ending August 31, 1874; average number of pupils per teacher in each county.

ARCHÆOLOGY.

State Archæological Association of Ohio, Columbus, relics of pre-historic races and Indians of Ohio, and maps of ancient earthworks, etc.

Western Reserve Historical Society, Cleveland, relics of Indians and pre-historic races of Ohio.

Firelands Historical Society, Norwalk, stone and flint implements and ornaments, pottery, etc.

Ohio Agricultural and Mechanical College, Columbus, historical and archæological map of Ohio, showing the location of ancient earthworks, etc., and copper and stone implements, etc.

Western Reserve College, Hudson, copper implements, stone pipes, hammers, etc.

A. W. Hawkins, Twinsburg, stone and flint implements and ornaments.

J. C. Shroyer, Cincinnati, stone and flint implements and ornaments.

L. M. Byrnes, Cincinnati, stone and flint implements and ornaments.

Thomas Cleneay, Cincinnati, stone implements and pottery.

Florian Giauque, Cincinnati, flint, stone, shell, and bone implements and ornaments.

H. H. Hill, Cincinnati, flint, stone, bone, and copper implements and ornaments, and pottery.

L. M. Hosea, Cincinnati, flint and stone implements and ornaments, pottery, etc.

C. B. Simrell, Cincinnati, flint, stone, shell, and bone implements and ornaments.

L. R. Freeman, Cincinnati, pottery, stone, and flint implements and ornaments.

R. M. Mercer, Cincinnati, pottery from mounds of Ohio.

R. E. Hawley, Cleveland, flint and stone implements and ornaments.

J. M. Johnson, Mt. Union, stone implements.

John F. Larkins, West Mansfield, stone implements.

Isaac Smucker, Newark, flint and stone implements and ornaments, casts and photographs.

M. C. Read, Hudson, flint and stone implements and ornaments, casts and photographs.

G. W. Chase, Newark, photographs and drawings of mounds, stone images, and implements.

Carbon Zane, Mifflin, stone and flint implements.

Marshall Anderson, Circleville, flint and stone implements, etc.

W. B. Sloan, Port Clinton, flints, and stone implements and ornaments.

A. N. Read, Norwalk, stone implements.

C. Cutler, Hudson, flint, stone, and iron implements.

Gustavus Kelley, Kelley's Island, flint and stone implements and ornaments.

Daniel Paul, Martinsburg, flint and stone implements.

M. F. Force, Cincinnati, copper implements of the mound builders.

Peter Neff, Gambier, sculptured head and implements of stone and flint.

Buchtel College, Akron, stone and flint ornaments and implements.

Mount Union College, Alliance, flint implements and weapons, pestles and mortars, sling-stones and pipes.

S. B. Matson, Shelby, mound implements, ornaments, etc.

Charles S. Whittlesey, Cleveland, archæological collection, surveys of mounds, earthworks, etc.

T. W. Kinney, Portsmouth, chisels, plates, pendants and other ornaments, stone relics, hammers, rollers, pestles, etc.

J. P. Henderson, Newville, stone, flint, and copper implements and ornaments.

J. F. Judge, Cincinnati, stone and flint implements and ornaments.

M. C. Morgan, Urbana, stone and flint implements.

C. L. Bartlett, Ravenna, stone and flint implements and ornaments.

Gilbert Munday, Montezuma, stone implements.

Ashtabula County Historical Society, Ashtabula, stone and flint implements and ornaments.

S. D. Peet, Ashtabula, stone and flint implements and ornaments.

John Beard, Attica, stone and flint implements and ornaments.

H. Bennett, Putnam, stone and flint implements and ornaments.

Wm. M. Cunningham, Newark, photographs of arrow-heads, pestles, etc.

MANUFACTURES.

W. J. M. Gordon, Cincinnati, chemicals, glycerine, sugar-coated pills, podophyllin, hydrastin.

Gest & Atkinson, Cincinnati, lard, tallow, grease, lubricating, burning, and paint oil, and car candles.

Hartman, Laist & Co., Cincinnati, glycerine.

Joseph Fromherz, Cincinnati, inks.

Iron-Clad Paint Co., Cleveland, paints manufactured from pure Lake Superior iron ores, as used in iron-smelting furnaces.

Charles Moser & Co., Cincinnati, colors, dry and pulp, paints in oil, coach colors, artists' colors.

Lorenz Brothers, Toledo, concentrated perfumes.

Barber Match Co., Akron, drawing-room and sulphur matches.

Shuler & Benninghofen, Hamilton, felts for paper-makers.

Henry Fox & Co., Urbana, cassimeres, tweeds, satinets, yarns, and flannels.

Piqua Woolen Mills, Piqua, paper-makers' fourdrinier and cylinder wet and press felts and jackets for all kinds of paper, flannel, blankets, jackets, and woolen socks.

Hopkins & Robinson Manufacturing Co., Akron, smoking pipes.

John Holland, Cincinnati, gold pens, pencils, toothpicks, etc.

A. B. Griffin, Ravenna, box and pyramid made of the woods of the world, containing 9,865 pieces.

Likly, McDonald & Rockett, Cleveland, fancy leatherwork, gun case, etc.

John Holland, Cincinnati, gold pens, pen-cases, and pen-holders.

United States Soapstone Manufacturing Co., Cincinnati, soapstone slate-pencils, crayons for blackboards or metals; manufacturers of soapstone goods of any description.

L. Cram, Dayton, paper and cardboard.

Haldeman Paper Co., Lockland, wrapping and carpet paper, building and roofing paper.

George P. Tangeman, Hamilton, carpet paper and roofing felt.

Robison, Savage & Co., Cleveland, Russia bound register books.

Sanford & Co., Cleveland, full Russia bank books, etc.

J. T. Woods, Toledo, splint for leg and thigh.

S. Wardle, Cincinnati, specimens of dentistry.

J. W. Donaldson, Massillon, block stamps for stamping garments for braiding or embroidery.

SCIENTIFIC AND PHILOSOPHICAL INSTRUMENTS, ETC.

H. M. Weaver, Mansfield, automaton balance scales.

Pulvermacher Galvanic Co., Cincinnati, electro galvanic appliances, etc., for medical purposes.

Lannert & Decker, Cleveland, indicators, annunciators, burglar alarms, and alphabetical telegraphic instruments.

Ohio Valley Piano Co., Ripley, pianos.

P. H. Dudley, Cleveland, drawings relating to various works.

Hanging Rock iron region, Ironton, geological map of the Ohio portions of the Hanging Rock region.

Henry Earnshaw, Cincinnati, photographs of parks and cemetery, water work's machinery, reservoirs, and drawing of tunnel.

FURNITURE, AND OBJECTS OF GENERAL USE IN CONSTRUCTION AND IN DWELLINGS, ETC.

Heard & Sons, Cleveland, architectural design of Ohio State building.

Mitchell & Rammelsburgh Furniture Co., Cincinnati, rosewood bed and bureau, Renaisance style; walnut dining furniture and hall stand, Mediæval style.

Delaware Chair Co., Delaware, double cane seat chairs.

F. & N. Shroeder, Cincinnati, pulpit, with sounding board.

Spiral Elliptic Spring Works, Cincinnati, springs for upholstering.

Lever Spring Bed Co., Springfield, spring bed.

Excelsior School Furniture Manufacturing Co., Cincinnati, church furniture.

Halm, Bellows & Butler, Columbus, set bed-room furniture, set dining-room furniture.

Hall's Safe and Lock Co., Cincinnati, fire, burglar, and fire and burglar-proof safes; deposit vaults.

N. U. Walker, Wellsville, sewer-pipe, terra-cotta ware, chimney-tops, statuary, tin tiles, stove linings, roofing tiles.

Laughlin Brothers, East Liverpool, iron stone china ware.

C. C. Thompson & Co., East Liverpool, pottery ware.

Brunt, Bloor, Martin & Co., East Liverpool, American white granite dinner, dessert, tea, and toilet decorated ware.

S. & W. Baggott, East Liverpool, Rockingham and yellow ware.

S. P. Sallandrouze, Cincinnati, plate-glass.

Diamond Glass Co., Ravenna, double thick glass from ground white sandstone, in windows of Ohio State building.

La Belle Glass Co., Bridgeport, table, bar, and lamp goods, cut and engraved ware.

W. O. Taylor & Son, Bedford, double cane seat chairs.

S. P. Sallandrouze, Cincinnati, venetian mirrors and hand glasses.

Pape Brothers & Kugemann, Cincinnati, mouldings for picture frames, portrait and photograph frames.

Cleveland Non-Explosive Lamp Co., Cleveland, Perkins & House metallic kerosene or coal oil safety lamps and filling cans.

United States Soapstone Manufacturing Co., Cincinnati, lava gas tips, soapstone griddles.

C. B. Evans, Cincinnati, iron mantles.

Garry Iron Roofing Co., Cleveland, sections of corrugated iron roof.

American Sheet and Boiler Plate Co., Cleveland, corrugated iron roofing, iron roofing tile.

House & Davidson, Cleveland, pair of front doors for Ohio building.

Ohio Tool Co., Columbus, planes, screws, edge tools, plane irons, handles, etc.

Sandusky Tool Co., Sandusky, plane, plane irons, bench and hand screws, chisel and file handles.

Dr. D. B. Sturgeon, Toledo, American depurating bath.

Cleveland Steel Horse Shoe Co., Cleveland, steel horse shoes and bars, hand shoe formers.

F. Tuchfarber & Co., Cincinnati, enameled iron show cards.

Hall's Safe and Lock Co., Cincinnati, bank and time locks.

Union Steel Screw Co, Cleveland, Bessemer steel, wood screws, with samples showing stages of manufacture.

Arms, Bell & Co., Youngstown, nuts, bolts, and washers.

Van Duzen & Tift, Cincinnati, bells.

M. C. Lilley & Co., Columbus, Masonic goods and society supplies, society furniture, jewels, regalia, banners, etc.

Kittridge Cornice and Ornament Co., Salem, sheet metal cornices, doors, shutters and pavilion, agricultural ornaments, light wrought-iron work.

EDUCATION AND SCIENCE.

Excelsior School Furniture Co., Cincinnati, school furniture and apparatus, geographical models.

S. C. Adams, Cincinnati, illustrated map of the world's history.

Wilson, Hinkle & Co., Cincinnati, educational books.

Educational exhibit of Ohio, by Charles S. Smart, State Commissioner of Common Schools.

Collective exhibit of the School of Design, University of Cincinnati; R. R. Whittemore, laocoon; W. W. Woodward, fugitive slave; Ella Humphreys, illumination and frescoed ceiling; Essle De Camp, panel; John Retig, center for ceiling and border for wainscoting; Susie Merrill, panel center.

CARRIAGE AND STOVE ANNEX.

Monitor Oil Stove Co., Cleveland, cook stove.

John Grossius, Cincinnati, stove for school houses, etc.

Weare Bros. & Co., Cincinnati, stoves.

William Resor & Co., Cincinnati, cooking stoves.

William Miller, Cincinnati, ranges.

Stiles & Co., Cincinnati, iron measures, buckets, and paint pails.

Union Manufacturing Co., Toledo, washboards, churns, lawn hose-carts, kitchen wooden ware.

American Lever Wringer Co., Springfield, clothes wringer.

A. W. Jennings, Bedford, clothes washer.

John C. Gove, Cleveland, domestic washing machine.

Champion Fence Co., Kenton, iron fencing.

Garry Iron Roofing Co., Cleveland, roofing, window shutters, and roofing cement.

Belts Roofing Co., Cincinnati, roofing.

Herman Eckel, Cincinnati, enameled iron hollow ware.

Topliff & Ely, Elyria, tubular bow, shaft, and pole sockets for carriages, springs, side-spring equalizers.

S. N. Brown & Co., Dayton, sulky, buggy and coach wheels, hubs, spokes, bows, shafts, poles, and yokes.

Sandusky Wheel Co., Sandusky, carriage wood-work.

James Woolworth, Sandusky, tool handles.

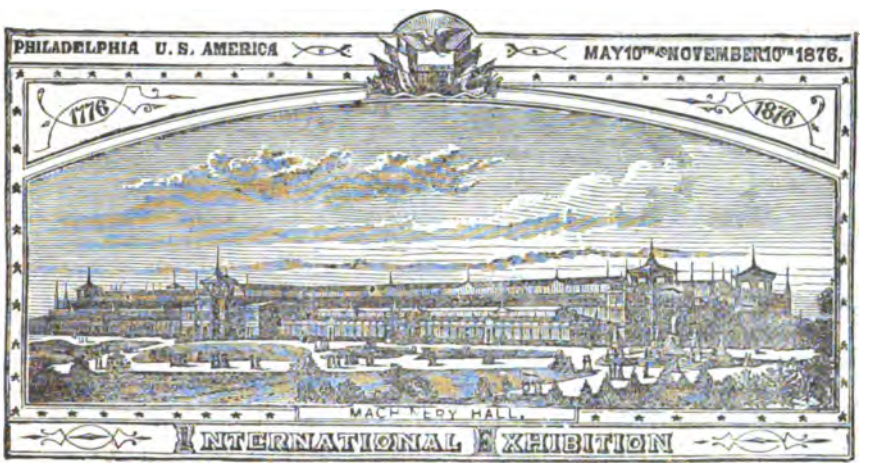
Cunningham, Portz & Co., Fostoria, spokes, felloes, neck-yokes, whiffletrees, pick and hammer handles, etc.

J. W. Gosling, Cincinnati, Brett carriage, top buggies, side-bar wagons.

Charles Behen, Cincinnati, barouche, physician's phæton, hearse.

World's Champion Car Coupler Co., Tiffin, car coupler.

MACHINERY HALL.



Fulton Foundry Co., Cleveland, turntable.

Calvin, Carr & Co., Cleveland, galvanized iron circular cornice machinery.

L. D. Towsley, Cincinnati, gas utilizer for manufacturing illuminating gas, and for saving one-half the coal gas of cities.

Joseph H. Bean, Cincinnati, automatic gas machine for residences, churches, etc.

Lane & Bodley, Cincinnati, stroke power mortises.

Peter Gerlach & Co., Cleveland, stave sawing machine.

Harry A. Crossley, Cleveland, stave jointer.

Silver & Deming Manufacturing Co., Salem, spoke tenoning machine.

J. A. Tay & Co., Cincinnati, patent wood cutting machinery.

Buckeye Engine Co., Salem, automatic shingle machine.

J. T. Baggs, Bridgeport, sawing and grooving machine.

A. Mussot, Cincinnati, general wood working machine.

A. M. Benson, Cleveland, stave machinery, dresser and jointer.

Lane & Bodley, Cincinnati, stationary portable saw-mill.

T. H. Bullock & Co., Cleveland, blacksmiths', moulders', hand and coopers' bellows.

Spiral Elliptic Spring Works, Cincinnati, machinery for making upholstering springs.

Long, Allstatter & Co., Hamilton, punching and shearing machines.

Cleveland Patent Manufacturing Co., Cleveland, bolt and pipe cutters, cutter heads.

James M. Ryan, Cincinnati, silver-plated lathe, show cases, and process for cutting glass.

Silver & Deming Manufacturing Co., Salem, blacksmiths' post and table drills.

Cleveland Screw and Tap Co., Elyria, milled, set, and cap screws, taps and nuts.

Franz & Pope Knitting Machine Co., Bucyrus, automatic knitting machines, knitting machines, seamless hosiery, samples of work.

St. John Sewing Machine Co., Springfield, sewing machines.

Home Knitter Co., Alliance, one needle knitter for stockings.

Jonas Hinkley, Norwalk, carpet and floor sweeper, knitting machines.

S. Short, Cincinnati, mangle and ironer, blanket washing machines.

Cleveland Paper Box Machine Co., Cleveland, machine for making paper boxes, nicking machine for blanks, and box knives.

Leopold Steigert, Cincinnati, meat chopping machine, with engine attachments.

Armstrong Heater Manufacturing Co., Toledo, improved heater, lime extractor, condenser, adjustable feed pump for boilers.

Stout, Mills & Temple, Dayton, turbine water-wheels, with and without flumes.

Stillwell and Bierce Manufacturing Co., Dayton, double turbine water-wheel. Simple, durable, and powerful.

James Leffel & Co., Springfield, double turbine water-wheel.

Buckeye Engine Co., Salem, automatic cut-off and throttling steam engines.

Griffith & Wedge, Zanesville, vertical portable engine, and centrifugal drying machine.

H. & F. Blandy, Zanesville, portable, agricultural, and saw-mill engines, and stationary engines.

Stillwell & Bierce Manufacturing Co., Dayton, lime extracting heater and filter combined.

Cleveland Steam Gauge Co., Cleveland, gauges, spring balances, test pump, and gauge.

Aultman, Miller & Co., Akron, self-registering dynamometer.

Post & Co., Cincinnati, steam gauges.

Toledo Pump Co., Toledo, wood pumps.

Carlile & Elliott, Steubenville, safety lock for elevators.

Wm. Powell & Co., Cincinnati, valves and lubricators, registering globe valve, automatic lubricators, etc.

Fred. Lunkenheimer, Cincinnati, automatic cylinder lubricators, glass oil-cups for steam engines, steam valves with re-grinding device, etc.

John L. Gill, Columbus, freight cars, car wheels.

Post & Co., Cincinnati, railway passenger car trimmings, locomotive head-lights.

M. Deal & Co, Bucyrus, separator and smutter, brush smutter, warehouse separator, mill machinery, trucks, etc.

Turner, Parks & Co., Cuyahoga Falls, rolling screen separator, middlings purifier, malt scourer, garlic, rat-ball, and straw extractor.

Stillwell & Bierce, Dayton, heater used in boiler house No. 4.

P. P. Mast & Co., Springfield, boiler used in saw mill boiler house.

Bentel, Margedant & Co., Hamilton, patent universal wood workers, planing and matching machines, band and scroll saws, etc.

GOVERNMENT BUILDING.

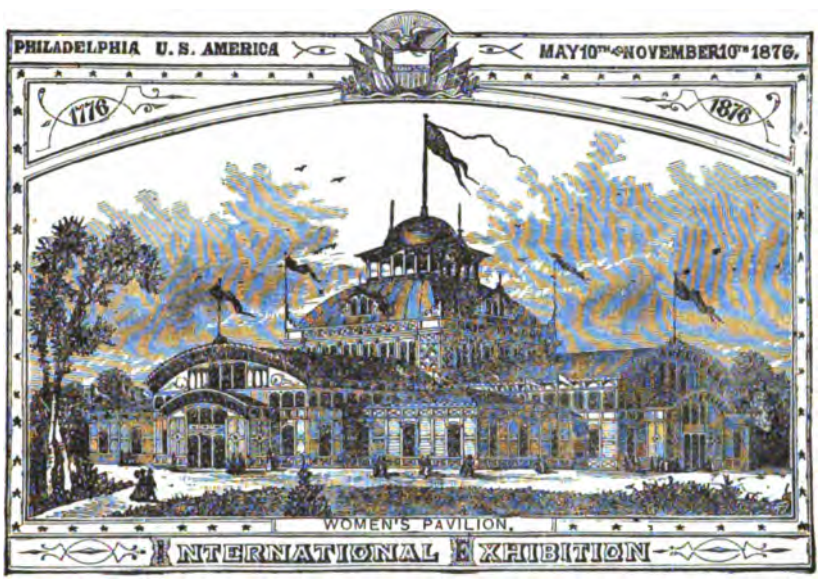
Open hearth steel, iron ores, flux and fuel, pig iron, potters' clay and pottery, crude and manufactured plaster, building stone, etc., from the State of Ohio, in the collections of the Smithsonian Institute and government departments.

Kelsey & Hosmer, Sandusky, fish dressing machine.

D. H. Shaffer, Cincinnati, mother of pearl from the American Unios.

Dr. C. A. Miller, Cincinnati, mother of pearl Unios.

WOMEN'S PAVILION.



Mrs. Charlotte Sterling, Gambier, dish washing machine.

Mrs. S. Short, Cincinnati, blanket washer, mangle, ironer, paint cleaner, and stretcher for drying curtains, etc.

Mrs. L. Drury, Springfield, dress cutting system.

Miss Lizzie Todd, Columbus, embroidery, embroidered shawls, and sacque.

Mrs. A. B. Huston, Cincinnati, embroidered motto.

Miss Flora Taneyhill, Alliance, oil painting.

Miss Josephine Klippart, Columbus, water color painting.

Mrs. Annie E. Wormley, Columbus, illustrations of the micro-chemistry of poisons, drawn and engraved on steel plates.

Mrs. Carrie P. Lovejoy, Columbus, preserved fern leaves.

Jane Watson, Massillon, North American mosses.

Mrs. H. Brothers, Cincinnati, wax flowers, and materials for making them.

ARTISTIC CARVING, CHINA PAINTING, ETC.; THE WORK OF THE LADIES OF THE SCHOOL OF DESIGN OF THE UNIVERSITY OF CINCINNATI, AND OTHER LADIES OF THAT CITY, UNDER THE AUSPICES OF THE WOMEN'S CENTENNIAL EXECUTIVE COMMITTEE OF CINCINNATI.

Miss Fannie M. Banks, carved Estey Parlor Organ, black walnut and ebony.

Miss Agnes Pitman, carved Ohio Valley Square and Grand Piano, rosewood.

Misses Hattie and Mary Johnson, carved walnut bedstead, ebony inlays, painted slate panels.

Mrs. and Miss Pitman, carved oak door, ebony inlays, black walnut door.

Mrs. A. B. Huston, carved dining-room mantel, painted slate panels.

Mrs. S. M. Barrett, carved walnut cabinet, silver bronze panels, ebony pillars.

Miss Agnes Pitman, carved hanging cabinet, ebony inlays and painted slate panels.

Mrs. and Miss Pitman, carved dining-room shelves.

Miss Flora I. Tidball, carved walnut child's bedstead.

Miss Mary L. Pack, carved oak secretary cabinet, original metal work.

Mrs. A. L. White, carved walnut dressing bureau.

Miss Agnes Pitman, carved chest of drawers, original metal work; carved bracket mantel, ebony inlays.

Miss Hattie D. Caldwell, carved celtic altar cross.

Miss Julia Rice, carved boudoir table.

Misses Hattie and Mary Johnson, carved hanging cabinet; large picture frame.

Mrs. E. F. Abbott, carved tea caddy.

Miss Alice Cooper, carved prie dieu.

Miss Laura B. Jordan, carved mahogany hanging cabinet, made from an old piano, a family relic, one hundred years old.

Mrs. E. F. Abbot, carved gentleman's dressing stand.

Miss Lizzie S Laws, carved gothic flower stand.

Miss Clara Gurley, carved writing desk.

Misses Hattie and Mary Johnson, carved wall pocket.

Miss Claude R. Hirst, carved parlor easel, and oil painting; jewel casket.

Mrs. S. M. Barret, carved chess table.

Miss Agnes Pitman, carved hanging secretary.

Mrs. A. L. White, carved large picture frame.

Mrs. Geo. Dominick, carved cherry wall pocket; casket.

Misses Hattie and Mary Johnson, carved photograph frames (three.)

Mrs. A. B. Huston, carved dog kennel frame; tray.

Miss Flora I. Tidball, carved flower stand.

Miss Lizzie M. Collier, carved tea pot rest.

Miss Daisy Burnett, carved coffee pot rest.

Mrs. A. B. Huston, carved bread plate.

Miss Jessie Stem, carved card receiver; wall pocket.

Miss Mary B. Swift, carved writing desk.

Miss Ada P. Drake, carved jardiniere, with painted tiles.

Miss Lizzie McClusky, carved wall pocket; photograph frame.

Miss Agnes Pitman, carved library stool; picture frame.

Mrs. N. R. Kidd, carved flower stand.

Miss A. Vallandigham, carved gentleman's dressing stand.

Miss Susie Merrill, carved flower stand, and painted bracket.

Miss Emma Newell, carved fruit plate.

Mrs. C. F. Hesser, carved flower stand.

Miss A. Donnelly, carved picture frame.

Miss Sarah Dunlap, carved wall pocket.

Miss H. Hollingshead, carved casket; frame.

Miss Hattie D. Caldwell, carved large frame.

Mrs. Wm. Dodd, carved casket.

Miss Mamie Rice, carved frame for Durer's *Christus*.

Miss R. N. Menzies, carved corner bracket.

Miss Lillie Brashear, carved parlor easel.

Miss Tillie Scudder, carved medicine cupboard.
Miss Clara Doherty, carved fruit plate.
Mrs. Theo. Kemper, carved oval tray.
Miss Agnes Pitman, carved fruit plate; card receiver.
Miss Minnie Shaler, carved chess board; picture frame.
Mrs. O. H. Temple, carved small frame.
Miss Mary Stribley, carved casket.
Miss Lillie Brashear, carved flower stand.
Mrs. O. H. Temple, carved bracket.
Miss Mary Stribley, carved picture frame.
Mrs. W. H. McDowell, carved gothic stand.
Miss Flora Metcalf, carved shield.
Miss Lizzie Tatum, flower stand.
Miss Isora Collord, carved book racks (two); casket.
Miss Essie DeCamp, carved book rack; frame and crayon portrait of Mozart.
Miss Helen Collord, prayer-book covers, ebony; trencher.
Miss Agnes Pitman, carved lamp stand.
Mrs. F. W. Clarke, carved chess board; book rack.
Miss Rose Robinson, carved card receiver.
Miss Helen Collord, carved frame.
Miss Louise Shaw, carved card receiver; bracket.
Miss Jennie M. Phillips, carved picture frame.
Miss Mary E. Cook, carved fruit plate.
Miss Carrie H. Gedge, carved small easel.
Miss Emily H. Wright, carved Chess board.
Miss Alice Cooper, carved wall pocket; card receiver.
Mrs. Wm. Este, carved pedestal.
Miss Mamie Rice, carved alms plate.
Mrs. Thos. Gibson, carved case for stereoscopic views.
Miss Jennie Bare, carved picture frame.
Mrs. Thos. Gibson, carved card receiver; frame.
Miss Louisa J. Kerr, carved casket; wall pocket.
Miss Augusta Tozzer, carved chair.
Mrs. Hinkle, carved book rack.
Miss Nellie Halliday, carved wall pocket; card receiver; writing desk.
Miss Clara Gurley, carved bracket; wall pocket.
Mrs. Larz Anderson, Jr., dog kennel frame.
Miss V. de Pelgrom, black walnut bedstead, unfinished.

PORCELAIN PAINTING, ETC.

Miss M. Louise McLaughlin, tray, Cupids, after Boucher.
Miss M. Louise McLaughlin, twelve egg cups, female heads, original.
Miss M. Louise McLaughlin, plate, landscape, after Birket Foster.
Miss M. Louise McLaughlin, plate, female head, Italian.
Miss M. Louise McLaughlin, plate, head, after Sir Joshua Reynolds' "Simplicity."
Miss M. Louise McLaughlin, two plates, female heads.
Miss M. Louise McLaughlin, teapot stand, silhouette, after Paul Konewka.
Miss M. Louise McLaughlin, cup and saucer, pink ground, with flowers.
Miss M. Louise McLaughlin, cup and saucer, pink ground, with Cupids.

Miss M. Louise McLaughlin, cup and saucer, portraits of George and Martha Washington.

Miss M. Louise McLaughlin, cup and saucer, same, monochrome.

Miss M. Louise McLaughlin, teapot stand, Oberon and Titania, after Paul Konewka.

Miss M. Louise McLaughlin, pair painted slate panels, flowers.

Miss M. Louise McLaughlin, oil painting, head, after Greuze.

Mrs. L. P. Meredith, three plates, flowers.

Mrs. L. P. Meredith, cake plate.

Mrs. L. P. Meredith, two slate panels, Raphael's cherubs.

Miss Rauchfuss, cup and saucer, children at play.

Miss Lottie Keenan, nine plates, wild flowers, maroon border.

Miss Lottie Keenan, two plates, wild flowers, unique border.

Miss Lottie Keenan, five fruit saucers, wild flowers.

Miss Lottie Keenan, vegetable dish, flowers.

Miss Lottie Keenan, two cups and saucers, wild flowers.

Mrs. A. S. Fisher, teapot stand, flowers.

Mrs. A. S. Fisher, plate, landscape.

Mrs. A. S. Fisher, cup and saucer, flowers.

Miss Agnes Pitman, two cups and saucers, grasses and flowers.

Mrs. A. B. Merriam, chocolate pitcher.

Mrs. A. B. Merriam, cup and saucer.

Mrs. E. G. Leonard, four plates, heads.

Mrs. E. G. Leonard, jewel box, child's head.

Mrs. E. G. Leonard, one cup and saucer, head and floral vine.

Mrs. E. G. Leonard, two plates, Cupids.

Mrs. E. G. Leonard, one plate, autumn leaves.

Mrs. E. G. Leonard, two plates, morning glories.

Mrs. E. G. Leonard, one cake plate, storks.

Mrs. E. G. Leonard, one teapot stand, blue bird.

Mrs. E. G. Leonard, one coffee cup and saucer, field flowers.

Mrs. E. G. Leonard, one plate, field flowers.

Miss Clara Newton, one large plate, arabesque.

Miss Clara Newton, one teapot stand, field grasses and bird.

Miss Clara Newton, one cup and saucer, storks.

Miss Lydia Shackelton, pair of water-color paintings, autumn leaves.

Miss Lydia Shackelton, Irish wild flowers, water color.

Mrs. A. B. Merriam, pair of water-color paintings, pansies.

Mrs. George Dominick, illumination.

Mrs. Wm. Este, bust, Just from the Bath.

Miss Agnes Pitman, Centennial embroidered bedspread and pillow covers.

Mrs. Mary Rivard, same.

Miss Bertha Dietz, lace border for same.

Miss Elizabeth Percy, lace spread and pillow covers for child's bed, ecru mediæval braid, in point lace.

Mrs. A. E. Wilde, maxims, with instructions for use in schools.

Oil painting of Fort Washington (Cincinnati) in 1789; photographic views of prominent buildings, residences, churches, bridges, fountain, etc., illustrative of Cincinnati in 1876.

Original metal work; hinges, plates, handleplates, etc.

WORK CARVED UNDER THE DIRECTION OF H. L. & W H. FRY, CINCINNATI.

Mrs. William Dodd, carved library table; parlor easel.

Mrs. M. F. Force, carved corner cabinet.

Mrs. F. Williams, carved child's bedstead, mahogany, with ebony inlays.

Miss M. Louise McLaughlin, carved hanging cabinet, walnut and ebony; jardiniere, painted slate panels.

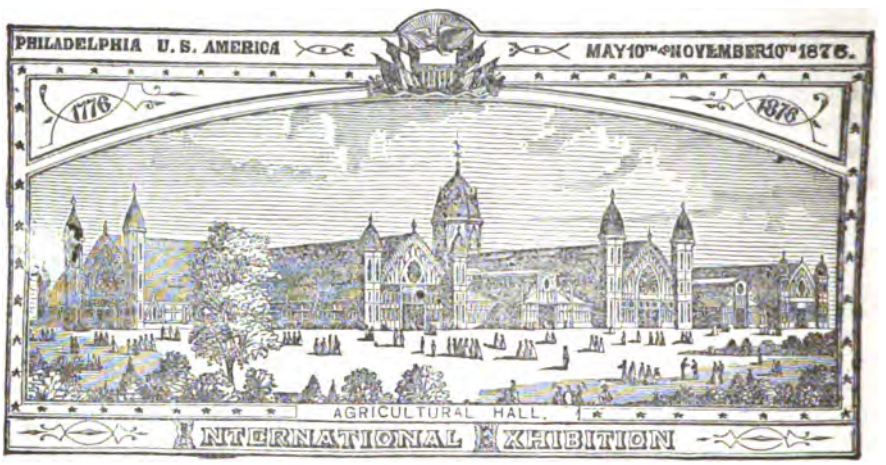
Mrs. A. S. Winslow, carved fire screen, with plate glass.

Mrs. Octa Soule Gottschall, Dayton, O., carved wall pocket, figures in alto relievo.

Miss Jennie A. Edgar, Dayton, O., carved panel for side of mantel, stork.

Mrs. J. B. Thresher, Dayton, O., carved portfolio cover, figures, the Genius of Art; easel.

AGRICULTURAL HALL.



AGRICULTURAL IMPLEMENTS AND MACHINERY.

Kissell, Blount & Co., Springfield, corn cultivator.

Bucher, Gibbs & Co., Canton, plows on revolving tables, representing 1776 and 1876.

H. & H. Park, Mt. Victory, fork, hoe, and broom handles.

Edwin Bayliss, Massillon, wheel, harrow, iron cultivator, and shovel plow.

Brown, Hinman & Co., Columbus, weeding hoes, garden rakes, manure and spreading forks, scythe snaths, etc.

Morrison & Fay, Bryan, plow, corn sheller.

P. P. Mast & Co., Springfield, grain drills, seed sowers, etc.

D. E. McSherry & Co., Dayton, grain and seed drills, rice drills.

Haworth Planter Co., London, Madison county, Dickey Corn drill, A. C. Kent's hand corn planter, etc.

J. & H. A. Campbell, Harrison, drill.

John Clarridge, Mt. Sterling, corn and cotton seed planter.

F. N. Stokes, Urbana, planter, fertilizer, and pulverizer.

Amos, Rank & Co., Canton, mowers, reapers, etc.

Warder, Mitchell & Co., Springfield, reapers and mowers.

John H. Thomas & Sons, Springfield, sulky spring-tooth hay rake.

Whitely, Fassler & Kelly, Springfield, reapers and mowers.

A. J. Ohmer, Hamilton, hand mowing machines.

John Dobbs, Dayton, sulky horse hay rakes.

J. Sedgebeer & Miller, Painesville, self-sharpening iron crusher and grinding mills.

B. C. Taylor, Dayton, wheel horse hay and grain rake.

A. W. Coates, Alliance, lock-lever horse hay rake.

Bolivar C. Converse, Springfield, reaping machines.

Huber Manufacturing Co., Marion, revolving hay rake, road scraper.

J. F. Seiberling, Akron, mower and attachments.

Whitman & Miles Manufacturing Co., Akron, mowing and reaping machine knives, sickles, and sections.

Aultman, Miller & Co., Akron, Improved Buckeye Reaper.

Bellaire Manufacturing Co., Bellaire, mowers and reapers.

C. Russell & Co., Canton, self-raker, reaper, and mower combined, and single mower.

C. Aultman & Co., Canton, Buckeye Mowing Machine.

Long, Allstatter & Co., Hamilton, rake, knives, sickles, mower and fodder cutter.

Clegg, Wood & Co., Dayton, self-discharging hay rake.

Henry Fisher, Canton, patent prairie mower knife grinders, etc.

Champion Machine Co., Springfield, reapers, mowers, rakers, and droppers.

C. Aultman & Co., Canton, Buckeye mower, etc.

George W. Rue, Hamilton, garden cultivator, potato digger.

A. Pritz & Sons, Dayton, grain drill, field roller, etc.

Barnard Cortrite, Norwalk, fanning mill.

A. S. Miller, Republic, fruit ladder.

Farmers' Friend Co., Dayton, grain and small seed drills.

L. Spence, Martin's Ferry, thresher and cleaner, double cleaner, horse power, etc.

Silver & Deming, Salem, endless chain, two-horse power for general purposes, drag, sawing machine, etc.

Blymyer Manufacturing Co., Cincinnati, thresher and cleaner, corn cob crushers, etc.

Hotsenpiller & Co., Springfield, hominy mill.

Sandusky Machine and Agricultural Works, Sandusky, cylinder corn sheller.

Mansfield Machine Works, Mansfield, mounted portable steam engine.

Thomas Hazard, Wilmington, straw cutters.

J. A. Treat, Cleveland, washing boiler and automatic blind governor, factory churn.

James Elliget, Cleveland, bottles, kegs, mugs, and pitchers.

Frederick Seel, Cincinnati, churn.

H. A. Ashley, Springfield, ditching machine.

Drake & Parmley, Painesville, fence post base.

Rhodes & Waters, Elyria, post-hole digger.

Nathan Starbuck, Wilmington, mounted ditcher.

J. A. Treat, Cleveland, carriage gate, outside Agricultural Hall.

James Kyser & Son, Cleveland, whiffletree, check, and neck-yoke fastening.

Francis J. Goldsmith, Painesville, invertible trough.

Gay & Bryant, Dresden, post-hole digger.

Henry Leonard, Basil, revolving ball on pedestal, and model of college building made with buckeyes.

G. Bouscaren, Cincinnati, model of apparatus for extracting saccharine juices of plants by diffusion.

Isaac N. Deardorff, Canal Dover, smokehouse stove.

William Russell, Cincinnati, hand and machine-made horse shoes, etc.

M. Steward, Urbana, dumping-cart.

WOOLS.

James Torrence, Utica, fine wools.

Isaac Thomas, Short Creek, Harrison county, fine wools.

W. B. Low, Connotton, Harrison county, fine wools.

J. M. Kirkpatrick, Utica, fine wools.

James B. Jamison, Cadiz, fine wools.

J. M. Holmes, Connotton, fine wools.

Andrew Jamison, Short Creek, fine wools.
W. O. Harrah, Cadiz, fine wools.
William Croskey, Hopedale, fine wools.
S. S. Campbell, Cadiz, fine wools.
H. Boyles, Cadiz, fine wools.
M. L. Birney, Bowerston, fine wools.
Walter Craig, Cadiz, fine wools.
Albert Quigley, Cadiz, fine wools.
W. W. Jamison, Cadiz, fine wools.
E. J. Hiatt & Brother, Chester Hill, Merino wool in fleece.
Andrew McFarland, New Athens, Harrison county, fine American Merino wools.

MISCELLANEOUS.

Woods, Perry & Co., Cleveland, white pine lumber.
C. B. Thompson, Chillicothe, broom corn.
C. K. Howlett, Hudson, stuffed birds of America.
Christian Foster, Hamilton, mounted birds of America; mounted animals of America.
Cuvier Club, Cincinnati, fish.
Evans Brothers, Cincinnati, hams, shoulders, etc.
Charles Jacobs, Jr., & Co., Cincinnati, hams, shoulders, etc.
J. L. Keck & Brothers, Cincinnati, pickled meats, lard, etc.
Kahn & Forbes, Cincinnati, hams, breakfast bacon, and family mess pork.
Evans, Lippincott & Cunningham, Cincinnati, bacon, hams, mess pork, lard, etc.
S. Davis, Jr., & Co., Cincinnati, smoked hams, breakfast bacon, etc.
James Morrison & Co., Cincinnati, hams, bacon, mess pork, lard, etc.
Ferd. Schumacher, Akron, oatmeal, barley, farina, etc.
A. A. Taylor, Toledo, flour.
Homer Baldwin, Youngstown, flour.
Julius J. Wood & Co., Columbus, laundry starch, corn starch for food.
Andrew Erkenbrecher, Cincinnati, starch, corn flour, etc.
George Fox, Cincinnati, starch.
H. J. Miller & Co., West Liberty, maple sugar and molasses.
William H. Mills, Sandusky, still and sparkling domestic wines.
Wehrle Werk & Son, Middle Bass Island, native wines.
Tromner Extract of Malt Company, Fremont, extract of barley malt.
James Levy & Brother, Cincinnati, whiskies.
Kelley's Island Wine Company, Kelley's Island, champagnes, clarets, catawba brandy.
Snider Brothers & Co., Cincinnati, cream biscuit.
Beckman & Co., Northern Ohio Woolen Mills, Cleveland, all wool shoddies.
H. H. Roe & Co., Madison, dairy appliances.

CEREALS, ETC., OF OHIO,

Contributed under the auspices of J. H. Klippart, Secretary of the Ohio State Board of Agriculture, and exhibited in Agricultural Hall.

P. Anderson, Nettle Creek Grange, Westville, samples of white corn.
J. W. Ames, Franklin county, yellow and sweet corn.
Allen County Infirmary, Lima, Egyptian wheat, yellow and white flint corn, timothy and red clover seed.
L. B. Anderson, Liberty Township Farmers' Club, Lewis Center, samples of yellow corn.

Samuel Adams, Waterford, mammoth sweet corn and premium beans.

—— Allen, Berlin, samples of red corn.

L. A. Baldwin, ———, samples of yellow dent, Yankee and yellow gourd seed corn.

E. M. Baker, Van Wert, samples of white corn, spring oats and Somerset oats.

Mrs. E. M. Baker, Van Wert, Valentine and Lima beans.

Thomas Bushnell, Hayesville, red Mediterranean wheat, black rye, yellow corn, and varieties of beans.

David Bevil, Waterford, Lawton field corn.

H. J. Bish, Darke County Grange, Greenville, Mediterranean wheat, navy beans.

Captain R. H. Baldwin, Chardon, Treadwell and Diehl wheat, winter rye, Michigan white and white Schönen oats, Herd's grass seed, beans, etc.

Henry Berkey, Perry county, silver hull buckwheat.

C. L. Bartlett, Ravenna, yellow corn, flax seed.

John Bean, Darke County Grange, Greenville, yellow corn.

G. H. B. Bennett, Franklin Grange 321, golden pop corn.

F. Billings, Margaretta, pop corn.

Barney DeMoss & Co., Roscoe, samples of rye, and purple straw Mediterranean wheat.

Herman Bordner, Stark, red wheat, Week's white wheat.

J. Bradner Burt, West Lafayette, red wheat, purple straw Mediterranean wheat, Tappahannock wheat.

William Burt, West Lafayette, pop corn.

F. Bailey, Lockington, red Mediterranean wheat, white blackberry and yellow Clinton corn.

James Buckingham, Zanesville, early Boughton wheat.

J. C. Brandt, Carroll, Fairfield county, Mediterranean wheat, yellow dent corn.

J. Blacker, Logan Grange 65, samples of sweet corn.

J. F. Clark, Shalersville, Eureka wheat.

George P. Clark & Sons, Mt. Pleasant, Crimea wheat, Rough and Ready wheat, white rye, buckwheat, flax and timothy seed.

J. G. F. Cellar, Liberty Township Farmers' Club, Lewis Center, red Mediterranean wheat, yellow corn, excelsior and brush-head oats.

J. B. Claypoole, Hooker's Station, Pennsylvania red wheat, early Kentucky white soft corn, varieties of beans, etc.

N. F. Claypoole, Hooker's Station, samples of wheat, buckwheat, rye.

R. P. Cannon, Aurora, timothy seed, marrow field beans.

E. M Claypoole, Nashport, yellow corn.

William Coate, ———, yellow corn.

C. D. Case, Liberty Township Farmers' Club, Lewis Center, yellow corn.

Norman Casey, Liberty Township Farmers' Club, Lewis Center, yellow corn.

H. F. Devol, Waterford, timothy and clover seed, navy and runner beans.

Darke County Grange, Greenville, sorgho seed, Norway oats.

E. Duncan, West Milton, red Mediterranean wheat, winter rye.

David Davis, West Milton, red Mediterranean wheat, winter rye.

J. B. Dort, New California, Jennings wheat, Somerset oats.

J. L. Dibra, West Milton, Seneca wheat.

A. B. Denune, Mifflinville, Franklin county, red wheat, varieties of corn.

Samuel Diffenderfer, Hayesville, sweet corn.

J. S. Elliott, Coshocton, Michigan wheat, King Philip Corn, wild goose buckwheat.

J. S. Elliott and G. Stuart, West Lafayette, large yellow corn.

J. S. Elliott and P. L. Stickney, West Lafayette, white oats, early corn.

George J. Evans, Mt. Pleasant, cuppy corn.

Isaac Funk, Darke County Grange, Greeneville, speckled corn.

Thomas Fleming, Barlow, Lake Erie white wheat, Diehl wheat.

S. Ferguson, Cadiz, samples of onion sets.

P. N. Gay, South Bloomfield, specimens of white and yellow corn, etc.

Robert Glenn, Hayesville, white flint corn.

A. E. Hoffman, Van Wert, white corn, prolific pop corn.

Jacob Hedges, Logan Grange 65, Circleville, Kentucky white corn.

S. E. Hedges, Logan Grange 65, Circleville, Lima beans.

John Z. Hissem, McKay, white soup beans.

G. O. Henry, Waterford, sorgho seed, sugar-cane seed, Kraut beans, half-runner beans.

A. H. Hissem, McKay, Schonen oats.

A. Hartle, Darke County Grange, Greeneville, white gipsey wheat, Plissinger white corn, pop corn.

Albert Hale, Mogadore, white Wabash wheat, Tod red wheat, yellow corn.

S. B. Hyler, Franklin Grange 321, Mercer county, red Mediterranean wheat.

John Harper, Hayesville, yellow bear's paw corn, white bear's paw corn, etc.

A. P. Howard, Woodstock, white cap, white, yellow, and yellow hackberry corn.

Walter Jamison, Cadiz, red chaff bearded Mediterranean wheat.

J. B. Jamison, Cadiz, barley oats and other oats, yellow corn.

J. W. Jamison, Cadiz, yellow corn.

S. A. Johnston, Shelby county, Norway oats.

James Keever, Lebanon, yellow corn.

James Kidd, Meigsville, velvet wheat.

K. W. Kinzey, Cadiz, clover seed.

W. S. Knapp, Liberty Township Farmers' Club, Lewis Center, sweet corn, white beans.

J. B. Lawton, Barlow, Lawton corn.

Lindsey Leggett, Waterford, Lawton field corn.

Log n Grange No. 65, Circleville, varieties of wheat, rye, corn, oats, sorghum and sugar cane seed, Hungarian grass seed, clover and timothy seed, beans, etc.

W. C. Long, Urbana, Fultz wheat.

B. F. Lambert, Reignersville, Morgan county, weevil proof wheat.

E. F. Lambert, McConnellsville, white prolific corn.

A. J. Lawrence, McConnellsville, yellow Dent corn, white Swedish oats, field beans.

W. W. Lyman, Mesopotamia, white bearded wheat, winter rye, sheep tooth gourd seed corn, pop corn, etc.

Thomas Lumsden, Waterford, Lancaster red wheat, Erie white wheat.

O. P. Laird, Mesopotamia, Indiana wheat.

J. S. Leaming, Wilmington, yellow corn.

William Lacy, Franklin Grange No. 321, Mercer county, samples of oats.

E. L. Lacy, Wilmington, yellow Dent corn.

J. W. Lambert, Reignersville, Norway oats.

D. Louderback, Jr., Nettle Creek Grange, Westville, red Mediterranean wheat.

J. C. Loughridge, McConnellsville, yellow Dent corn, pop corn.

A. J. Leonard, Liberty Township Farmers' Club, Lewis Center, yellow corn.

J. A. Myers, Liberty Township Farmers' Club, Lewis Center, red Mediterranean wheat, Excelsior oats, timothy seed, buckwheat.

G. W. Miller, Franklin Grange 321, Mercer county, varieties of oats.

N. H. McCoy, Van Wert, Egyptian white wheat.

John Maidlaw, Putnam county, varieties of wheat.

A. McFadden, Cadiz, varieties of oats, timothy seed.

G. H. Marsh, Van Wert, mammoth clover seed.

A. D. McCormick, McConnellsville, Michigan amber wheat.

D. Miller, Darke County Grange, Greenville, amber wheat.

W. B. McFadden, Cadiz, varieties of beans.

J. H. Monroe, Franklin Grange 321, Mercer county, Calico corn, yellow corn.

John Munday, Franklin Grange 321, Mercer county, red pop corn.

M. E. Morgan, Urbana, Talbot white corn.

William Nixon, Waterford, evergreen bush broom corn.

Nettle Creek Grange, Westville, varieties of wheat and corn.

Curtis Otwell, Darke County Grang , Greenville, Cooley corn.

Elisha Packer, Harrisville, Lancaster red wheat.

David Putnam, Salina, Tappahannock wheat, white winter rye, Indiana yellow corn, white bread corn, pop corn, silver hull buckwheat, Swedish and Excelsior oats.

George B. Prentice, Ashtabula, Irish wheat.

D. Prentis, Nettle Creek Grange, Westville, yellow corn.

Samuel G. Pyle, Clarksville, varieties of corn.

Reynolds & Hill, Huron, yellow Dent corn, evergreen sweet corn, rice pop corn, Huron oats, black oats, etc.

George Richmond, Perkins, Erie county, clover seed.

Horace Smith, Berlin, Erie county, red Lancaster wheat, Early Boughton wheat, Hackberry yellow corn, white oats.

John Rife, Cadiz, red wheat.

James Snowdon, Margaretta, white corn.

Jonathan Smith, Hamilton, fourteen varieties of corn.

S. Sanford, Lima, sweet corn, oats, varieties of beans.

T. P. Skinner, Sego, Perry county, white-blue stem wheat, hominy corn, yellow corn, surprise oats, flaxseed.

Ernest B. Skinner, Sego, varieties of pop corn.

Samuel Smith, Margaretta, Erie county, Diehl wheat.

J. R. Sheldon, Waterford, timothy seed, Jacobs' hybrid beans, goose beans, kidney bunch beans.

W. W. Scott, Hayesville, white kidney beans.

L. W. Skipton, Waterford, wax beans.

L. N. Stamp, Nashport, yellow corn.

D. B. & R. W. Shaw, Waterford, Shaw corn.

Randolph Tritt, Urbana, red Mediterranean wheat, varieties of rye.

G. Townsend, Waterford, gray buckwheat, varieties of pop corn.

E. Tyler, Franklin Grange 321, red sorgho seed.

E. G. Taggart, Liberty Township Farmers' Club, Lewis Center, yellow corn.

S. Taylor, Nettle Creek Grange, Westville, white corn.

L. U. Todd, Vermillion, buckwheat.

N. S. Vincent, Westerville, red chaff Mediterranean wheat, Fultz wheat, four varieties of yellow corn, white corn, pop corn.

D. Van Voorhis, white and yellow corn, yellow corn.

D. F. Van Ness, Hayesville, yellow Dent corn.

Jacob Wyanett, Cadiz, white Diehl wheat, yellow corn, buckwheat.

Charles Waldron, Brimfield, Diehl wheat.

T. Williamson, Hooker's Station, Mediterranean wheat.

Washington Grange, varieties of wheat, corn, rye, oats, buckwheat and beans.

H. B. Willis, Liberty Township Farmers' Club, Lewis Center, yellow corn.

J. Wood, Waterford, Wood's mixture corn, silver top pop corn, black syrup cane seed, speckled cranberry beans, white cranberry beans.

M. Williamson, Liberty Township Farmers' Club, Lewis Center, yellow corn, flaxseed.

C. E. Williamson, Hooker's Station, yellow corn, pop corn.

William Wallace, Hayesville, red mixed corn, pop corn, field beans.

R. K. Willis, Liberty Township Farmers' Club, Lewis Center, yellow corn.

H. B. Willis, Liberty Township Farmers' Club, Lewis Center, varieties of oats.

William Wareham, Nashport, samples of corn.

B. Washburn, Vermillion, field corn, Codey's early white corn, early Dent corn.

J. H. Way, Shalersville, yellow Flint corn.

B. W. Keyes, Marysville, maple sugar.

John H. Klippart, Columbus, maple sugar.

John T. Boggess, tobacco and tobacco seed.

John H. Klippart, Columbus, plaster casts of the fish of Ohio.

George J. Evans, Mt. Pleasant, Jefferson county, flower ladders.

George Brain, Springfield, Peachblow potatoes.

John Keblinger, Springfield, Early Rose potatoes.

William Oats, Springfield, Early Rose potatoes.

William Wingart, Northampton, Late Rose and Peerless potatoes.

Charles Dury, Cincinnati, prepared and mounted specimens of the lake and river fish of Ohio.

John H. Klippart, Columbus, Ohio, live fish, of several varieties.

POMOLOGY.

Exhibit made by the State Horticultural Society, September 11th to 20th, represented by Dr. J. A. Warder, President, M. B. Bateman, Secretary, and L. Wells, Committee.

The collection of fruits filled 1,100 plates, of which 1,000 were apples, the rest peaches and grapes. There were 190 varieties of apples, 20 of pears, 25 of grapes, and 3 or 4 of peaches. The contributions were from twenty-four different counties, embracing nearly all sections of the State, as follows:

Williams county, by Northwestern Horticultural Society, five hundred and thirty varieties of apples and eight of pears.

Lucas County Horticultural Society, by F. Granger, Toledo, forty-eight varieties of apples; and ten varieties of pears by A. Fahnestock.

Richland Horticultural Society, by F. R. Palmer, Mansfield, thirty-one varieties of apples.

Ross County Society, by Messrs. Huest and Scott, Chillicothe, fifty varieties of apples, six pear, and one of plum.

Pickaway County Society, Circleville, fine assortment of apples.

Eastern Ohio Society, Belmont and Guernsey counties, one hundred and five varieties of apples.

Columbiana county, by G. H. Coulson, Buck's P. O., one hundred varieties of apples.

Jefferson county, by J. F. Oliver and others, Steubenville, fifty-three varieties of apples.

Clinton county, by L. Weltz, Wilmington, large collection of apples and a few pears and peaches.

Clermont county, by Messrs. Gatch and Barr, from the State Fair, two barrels fine apples.

Washington county, by Joseph Wood, Marietta, one barrel apples.

Fulton county, by P. F. Chamburd, Fayette, large assortment of apples.

Perry county, S. M. Lentz, Somerset, fifty varieties of apples.

Knox county, by Starr & Colville, Mt. Vernon, twenty-five varieties of apples.

Lake county, by R. Marshall, Painesville, one barrel apples.

Ashtabula county, by A. D. Strong, assortment of apples, nice apple jelly, and apple wine.

Cuyahoga county, by L. A. Cahoon, Dover, assortment of fine grapes.

Erie county, by Reynolds & Stowe, forty varieties of fine grapes; and six varieties of grapes by L. M. Todd.

Warren County Horticultural Society, at Lebanon, a barrel of nice apples.

Summit county, by S. D. Harris, Hudson, small lot of apples and pears.

Montgomery county, by Wm. Ramsey, Dayton, small assortment of apples and a plate of pears.

Delaware county, by G. W. Campbell, Delaware, fifteen varieties of grapes, mostly new sorts.

Fairfield county, by Messrs. Fetters & Barr, a barrel of fine apples from the State Fair.

WAGON BUILDING.

Charles H. Crater, North Kingsville, vehicle coupling.

Charles Rauch, Cleveland, ice wagon.

Milburn Wagon Company, Toledo, spring, farm and freight wagons, sleds.

S. D. Stuart, Urbana, dumping wagon.

BREWERS' BUILDING.

H. Mueller & Co., Cleveland, barley and malt.

J. Walker & Co., Cincinnati, ale and porter.

Grasser & Brand, Toledo, beer.

Kirby Bung Manufacturing Co., Cincinnati, bung machine and saw.

John Link, Cincinnati, barrels and kegs.

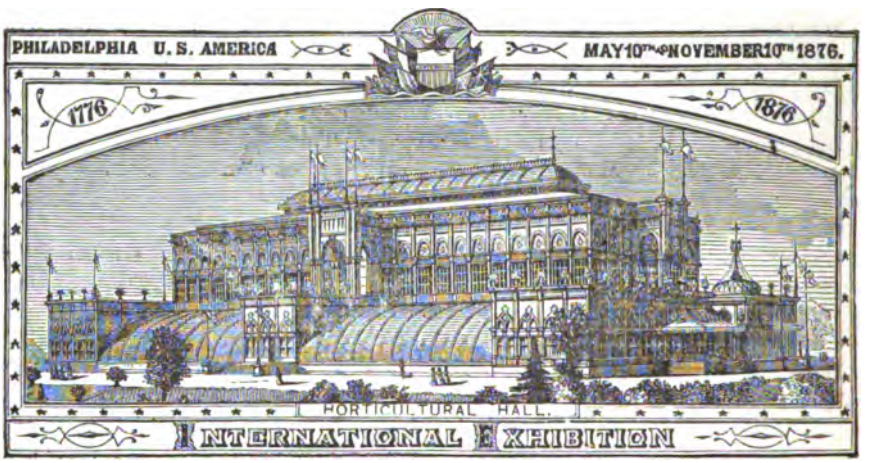
Dieringer & Co., Cincinnati, coopers' work.

Luckhaupt Bros., Columbus, kegs.

F. Tuchfarber & Co., Cincinnati, show cards.

Cope & Maxwell Manufacturing Co., Cincinnati, air pumps.

HORTICULTURAL HALL.



H. Acosta Kresken, Cincinnati, preserved flowers, leaves, grasses, bouquets, baskets, crowns, etc.

Jacob Hoffner, Cincinnati, sago palm more than one hundred years old; belonged to Robert Morris in 1776.

SHOE AND LEATHER BUILDING.

Rudolph Semenitz, Cleveland, English top boots.

Striebley & Co., Cincinnati, ladies', misses, and children's shoes.

George Hocker, Cincinnati, ladies' and gentlemen's boots and shoes.

F. Kilsheimer, Cincinnati, men's boots, shoes, and gaiters.

Prichard, Smith & Co., Cincinnati, boots and shoes.

Frank Alter & Co., Cincinnati, boots and shoes.

Cincinnati Shoe Manufacturing Co., Cincinnati, ladies', misses', and children's boots and shoes.

Krippendorf & Hart, Cincinnati, ladies', misses', and children's shoes.

E. & D. Nepper, Cincinnati, oak sole leather.

Elsas & Pritz, Cincinnati, oak sole leather.

Louis Ballauf, Cincinnati, oak sole leather.

A. Steigler & Co., Cincinnati, oak sole, harness, and skirting leather.

Henry Kessler, Cincinnati, oak sole and harness leather.

Lang & Warner, Cincinnati, oak sole and harness leather.

John H. Lawrence, Cincinnati, skirting, calf, seating, and bridle leather.

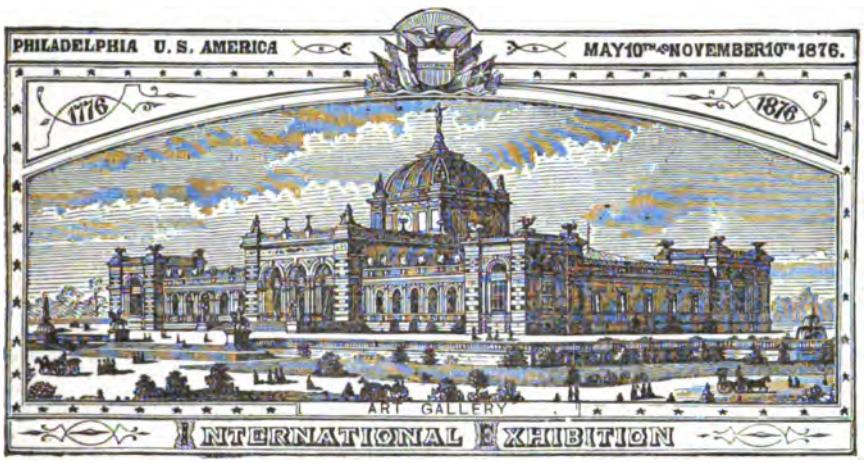
Martin & Riddle, Cincinnati, russet leather.

Henry Freiberk, Cincinnati, harness leather.

Lewis C. Bardes, Cincinnati, oak tanned harness leather.

Michael Eckert, Cincinnati, oak sole leather, slaughter hides, etc.

ART DEPARTMENT.



PAINTINGS.

W. H. Machen, Toledo, still life—Game, owned by artist.

P. B. West, Cleveland, still life—Game, owned by Mrs. M. L. Dickinson.

J. R. Tait, Cincinnati, Summer, owned by artist.

J. R. Tait, Cincinnati, Autumn, owned by artist.

A. M. Willard, Cleveland, Yankee Doodle, owned by artist.

T. S. Noble, Cincinnati, The Tramp, owned by artist.

W. H. Machen, Toledo, still life—Ruffled Grouse, owned by artist.

Mrs. H. C. Sterling, Gambier, Oak Leaves—water-color, owned by artist.

E. F. Miller, Columbus, landscape—water-color, owned by artist.

E. F. Miller, Columbus, Winter—water-color, owned by artist.

SCULPTURE.

Mendbenk, Cincinnati, Auld Lang Syne, owned by artist.

W. McDonald, Cincinnati, Iolanthe, King Rene's blind daughter, owned by artist.

Eli Jacquier, Cincinnati, bust of Shakspeare, owned by artist.

C. L. Feltweis, Jr., Cincinnati, Cast Away, owned by artist.

G. S. McGregor, Cleveland, specimens of oak, walnut, and rosewood graining.

Worthington & Sons, North Amherst, sandstone pedestal, from their quarries, presented to Memorial Hall.

PHOTOGRAPHIC HALL.

T. T. Sweeny, Cleveland, photographic views.

J. F. Ryder, Cleveland, photographs in crayon, and chromo Yankee Doodle.

J. Landy, Cincinnati, collection of character photographs representing the Seven Ages of Man, Laughing and Crying Babies, and large photograph portraits.

J. C. Harring, Massillon, photographic portraits.

Mrs. A. K. Weaver, Salem, photograph—fern leaf mottoes.

G. W. Collins, Urbana, cabinet photographs.

Leon Van Loo, Cincinnati, photographic portraits, single and in groups.

OHIO STATE BUILDING.

Peter Neff, Gambier, collection of pictures and plates showing the development of the art of making photographic pictures upon iron plates, etc.; exhibited as a contribution to the history of photography.

STOVE BUILDING.

Fuller, Warren & Co., Cincinnati, stove building, 60 by 45 feet, containing samples of stoves, heaters, and ranges in operation.

SHEET-METAL PAVILION.

Kittredge Cornice and Ornament Company, Salem, pavilion 22 by 40 feet, made of sheet metal, and containing samples thereof, ornaments, etc.

LIVE STOCK.

HORSES.

Thoroughbred Turf Stallions.

M. H. Cryer, Salem, Ohio, "Julius," 14 years. Sire, Timoleon; g. sire, Lexington; g. g. sire, Boston. Dam, Julia; g. dam, Sally Ward; g. g. dam, Lisbon Maid.

Trotting Stallions.

E. B. Hoge, Flushing, Ohio, "Amos Cassius M. Clay," 22 years, 16 hands, 1,200 pounds. Sire, Goodwin's Cassius M. Clay; dam, Molly, by Phœnix.

Roadsters.

M. H. Cryer, Salem, Ohio, "Pigeon."

DOGS.

Pointer Bitches, over fifty pounds weight, over two years.

E. M. Gillespie, Columbus, Ohio, "Belle," liver and white ticked, out of Flora, from stock owned and bred by Henry Clay, Kentucky, by Bill, he by Ned, imported to Beloit, Wisconsin, 1858, by Mr. Wilkinson.

Pointer Bitches, under fifty pounds weight, over two years.

E. M. Gillespie, Columbus, Ohio, "Fan," black, bred in Maryland, from imported stock.

Pointer Dog Puppies, under one year.

E. M. Gillespie, Columbus, Ohio, "Ned," deep liver and white ticked, 5 weeks; pedigree same as bill.

"Mack," deep liver and white, 5 weeks; pedigree same as Bill.

SHEEP.

Merinos—Rams.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Keystone," 1 year. Bred by exhibiters. Sire, Victor; g. sire, Bucher 2d. Dam, Rose; g. dam, Old Silvermine.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Target," 1 year. Bred by exhibiters. Sire, Old Oak; g. sire, Hunchback. Dam bred by H. Hammond, Vermont; g. dam bred by H. Hammond, Vermont.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Lion," 2 years. Bred by exhibiters. Sire, Fearnaught; g. sire, Panic. Dam, Lucy.

E. J. Hiatt & Bros., Chester Hill, "Kendrick," 3 years. Bred by exhibiters. Sire, Rocky Mountain; g. sire, Old Grant. Dam, Blue Stocking.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Columbus," 2 years. Bred by James Glass, Burgettstown, Pa. Sire, Noonday; g. sire, Green Mountain.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Buckeye," 5 years. Bred by exhibiters. Sire, Old Grant; g. sire, Gibbs' ram. Dam, Sue.

Merinos—Ewes.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Flow," 1 year. Bred by exhibiters. Sire, Fearnaught; g. sire, Panic. Dam, Old Grant.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Blue Stocking 5th," 1 year. Bred by exhibiters. Sire, Fearnaught; g. sire, Panic. Dam, Blue Stocking.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Vilda 2d," 1 year. Bred by exhibiters. Sire, Fearnaught; g. sire, Panic. Dam, Vilda.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Victorine," 4 years. Bred by E. S. Stowell, Vermont. Sire, Panic; g. sire, Red Leg.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Old Tulip," 6 years. Bred by exhibiters. Sire, Old Grant; g. sire, Gibb's ram. Dam, Sus.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Blue Stocking 2d," 6 years. Bred by exhibiters. Sire, Old Grant; g. sire, Gibb's ram. Dam, Blue Stocking.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Rosette," 5 years. Bred by E. S. Stowell, Vermont. Sire, Panic; g. sire, Red Leg. Dam bred by E. S. Stowell, Vermont.

E. J. Hiatt & Bros., Chester Hill, Ohio, "Fancy," 2 years. Bred by exhibiters. Sire, Fearnaught; g. sire, Panic. Dam of Vermont stock.

SWINE.

Berkshires—Boars.

A. Ware, Washington Court House, Ohio, "Favorite," 10 months, 350 pounds. Sire, Duke of Glendale, imported; g. sire, Plymouth. Dam, Emma; g. dam, Berkley Queen.

Berkshires—Sows.

A. Ware, Washington Court House, Ohio, "Nellie," 1 year, 4 months, 400 pounds. Sire, Fitz Lee; g. sire, Prince Adam, imported. Dam, Maggie May; g. dam, Betty Lee.

A. Ware, Washington Court House, Ohio, "Emma," 3 years, 3 months, 500 pounds. Sire, Royal Oxford; dam, Berkley Queen; g. dam, Short Annie.

A. Ware, Washington Court House, Ohio, "Emma 4th," 10 months, 200 pounds. Sire, Duke of Glendale; g. sire, Plymouth. Dam, Emma; g. dam, Berkley Queen.

A. Ware, Washington Court House, Ohio, "Emma 3d," 10 months, 300 pounds. Sire, Duke of Glendale; g. sire, Plymouth. Dam, Emma; g. dam, Berkley Queen.

Chester White—Boars.

S. H. Todd, Wakeman, Ohio, "Perfection," 1 year, white. Bred by E. B. Ashbridge, Willistown, Pa.

S. H. Todd, Wakeman, Ohio, "Burns," 1 year, white. Bred by E. B. Ashbridge, Willistown, Pa. Sire, Tom Reilly; g. sire, North America. Dam, Giantess; g. dam, Lady Fletcher.

S. H. Todd, Wakeman, Ohio, "Champion," 7 months, white. Bred by exhibiter. Sire, Dick; g. sire, Guigir; Dam, Flora; g. dam, Sus.

S. H. Todd, Wakeman, Ohio, "Champion 2d," 7 months, white. Bred by exhibiter. Sire, Dick; g. sire, Guigir. Dam, Flora; g. dam, Sus.

Chester White—Sows.

S. H. Todd, Wakeman, Ohio, "Barenep," 1 year, white. Bred by exhibiter. Sire, Tom Reilly; g. sire, North America. Dam, Giantess; g. dam, Lady Fletcher.

S. H. Todd, Wakeman, Ohio, "Lady Markes," 2 years, white. Bred by exhibiter. Sire, Billy; g. sire, Grand North America. Dam, Lady Chester; g. dam, Sweepstakes.

S. H. Todd, Wakeman, Ohio, "Laport," 2 years, white. Bred by exhibiter. Sire, Billy; g. sire, North America. Dam, Molly; g. dam, Little Queen.

S. H. Todd, Wakeman, Ohio, "Lady Pierce," 3 years, white. Bred by exhibiter. Sire, Billy; g. sire, North America. Dam, Beauty; g. dam, Little Queen.

S. H. Todd, Wakeman, Ohio, "Adia," 16 months, white. Bred by exhibiter. Sire, Guigir; g. sire, Chester Boy. Dam, Snowflake 2d; g. dam. Motley.

S. H. Todd, Wakeman, Ohio, "Lizzie" (with litter), 16 months, white. Bred by exhibiter. Sire, Billy; g. sire, North America. Dam, Beauty; g. dam, Pierce sow.

S. H. Todd, Wakeman, Ohio, three sows, 6 months, white. Bred by exhibiter. Sire, Billy; g. sire, North America. Dam, Snowflake 2d; g. dam, Motley.

Fat Swine.

S. H. Todd, Wakeman, Ohio, "Burns" and "Barenep" (boar and sow), Chester White.

Ervin L. Parrett, Washington, Ohio, pair of fat ed hogs, Poland-China.

Ervin L. Parrett, pair of fatted hogs, any breed.

Poland-China—Boars.

E. & J. M. Klever, Bloomingburg, Ohio, "Duke of Greenwood," 2 years old, dark. Bred by exhibiters. Sire, Occident; g. sire, Alex. Dam, Oxford Belle 2d; g. dam, Oxford Belle 1st.

E. & J. M. Klever, Bloomingburg, Ohio, "Beecher," 9 months, dark. Bred by exhibiters. Sire, Occident; g. sire, Alex. Dam, Oxford Belle 2d; g. dam, Oxford Belle 1st.

E. & J. M. Klever, Bloomingburg, Ohio, "Tilton," 9 months, dark. Bred by exhibiters. Sire, Alex; g. sire, Fox Ear. Dam, Nellie Bly; g. dam, Perfection.

E. & J. M. Klever, Bloomingburg, Ohio, "Duke Castol," 1 year, black. Bred by exhibiters. Sire, Occident; g. sire, Alex. Dam, Gold Finch; g. dam, Finch's Black Bess.

Ervin L. Parrett, Washington, Ohio, "Monfort," under 1 year, dark. Bred by exhibiter. Sire, Blackwood. Dam, Lulu.

Ervin L. Parrett, Washington, Ohio, "Neptune," under 1 year, dark. Bred by exhibiter. Sire, Wildwood. Dam, Black Finch.

Ervin L. Parrett, Washington, Ohio, "Wildwood," dark.

Ervin L. Parrett, Washington, Ohio, "Blackwood," dark.

Poland-China—Sows.

E. & J. M. Klever, Bloomingburg, Ohio, one sow, under 1 year. Bred by exhibiters. Sire, Perfection 2d; g. sire, Duke of Oxford. Dam, Queen of Fayette; g. dam, Cassie Lee.

E. & J. M. Klever, Bloomingburg, Ohio, pen of three sows, 9 months to 1 year, dark. Bred by exhibiters. Sire, Perfection 2d; g. sire, Duke of Oxford. Dam, Queen of Fayette; g. dam, Cassie Lee.

E. & J. M. Klever, Bloomingburg, Ohio, "Fairy," 1 year, black and white. Bred by exhibiters. Sire, Duke of Oxford; g. sire, Dave Finch. Dam, Cassie Lee; g. dam, Beauty.

E. & J. M. Klever, Bloomingburg, Ohio, "Lady Greer," 4 years, black and white. Bred by W. W. Greer, Oxford, Ohio. Sire, Billy 2d; g. sire, Old Billy. Dam, Beauty; g. dam, Greer's Favorite.

E. & J. M. Klever, Bloomingburg, Ohio, "Nellie Bly," over two years, black and white. Bred by W. C. Kankison, Blue Ball, Ohio. Sire, Kaiser; g. sire, Boyd Hog. Dam, Perfection; g. dam, Lady Pugh.

E. & J. M. Kleever, Bloomingburg, Ohio, "Empress," 1 year, dark. Bred by exhibiters. Sire, Duke of Oxford; g. sire, Dave Finch. Dam, Cassie Lee; g. dam, Beauty.

Ervin L. Parrett, Washington, Ohio, "Valley Girl," 1 year, spotted. Bred by exhibiter. Sire, Wildwood; g. sire, Mac. Dam, Lady McCreary; g. dam, Beauty.

Ervin L. Parrett, Washington, Ohio, "Lotta," 1 year, spotted. Bred by David Monfort, Monroe, Ohio. Sire, Perfection; g. sire, Conover's Bismarck. Dam, a pure bred Poland-China; g. dam, a pure bred Poland-China.

Ervin L. Parrett, Washington, Ohio, "Lulu."

Ervin L. Parrett, Washington, Ohio, "Alice."

Ervin L. Parrett, Washington, Ohio, "Duchess," under 1 year. Bred by exhibiter Sire, Blackwood; g. sire, Duke of Oxford. Dam, Cassie Lee.

Ervin L. Parrett, Washington, Ohio, pen of three sows, under 1 year, Gold Finch, Spotted Finch, Duchess. Bred by exhibiter.

Ervin L. Parrett, Washington, Ohio, "Gold Finch," under 1 year, dark. Bred by exhibiter. Sire, Wildwood. Dam, Black Finch.

Ervin L. Parrett, Washington, Ohio, "Queen Marshall," 1 year and under 2, dark. Bred by James Marshall, Middletown, Ohio.

POULTRY.

W. H. Todd, Vermillion, Ohio, light Brahmas over 1 year old; light Brahmas under 1 year; dark Brahmas over 1 year; dark Brahmas under 1 year; partridge Cochins under 1 year; buff Cochins over 1 year; buff Cochins under 1 year; white Cochins over 1 year; black Cochins under 1 year; white Leghorns over 1 year; white Leghorns under 1 year; brown Leghorns under 1 year; Houdons under 1 year; Plymouth Rocks under 1 year; Toulouse geese; White China geese; Aylesbury ducks; Cayuga ducks; Rouen ducks; Pekin ducks.

Mosgrove Broadwell, Urbana, Ohio, Partridge Cochins.

Wesley C. Ludlow, Clermont, Ohio, red Mexican bantams over 1 year; red Mexican bantams under 1 year.

AWARDS OF MEDALS AND DIPLOMAS GRANTED TO OHIO EXHIBITERS.

GROUP I.

Cleveland Rolling Mill Company, Cleveland, Bessemer steel and Sieman-Martin steel rails, terging.

Forest City Stone Company, Cleveland, flagging.

Cartright, McCurdy & Co., Youngstown, hoop-iron.

M. F. Richey, Waverly, building stone.

J. McDermott & Co., Cleveland, building stone.

L. Halderman & Son, Cleveland, building stone.

Coshocton Stone Company, Coshocton, building stone.

Clough Stone Company, Amherst, building stone.

Black River Stone Company, Grafton, building stone.

P. H. Clemens, Sandusky, building stone.

D. C. Statler, Dayton, building stone.

Worthington & Sons, North Amherst, grindstones, scythestones, and sandstone.

George Sintz, Springfield, building stone.

Marcus Bosler, Dayton, building stone.

Amherst Stone Company, Cleveland, grindstones.

M. & J. Finnegan, Cincinnati, building stone.

Wilson & Hughes Stone Company, Cleveland, building stone.

C. B. Wells, Marietta, Constitution building stone.

Warthorst & Co., Massillon, building stones and grindstones.

Z. S. Stocking, Mansfield, variegated stone.

Stitt, Price & Co., Columbus, building stone.

Glasgow and Port Washington Iron and Coal Company, pig iron.

Tuscarawas Coal and Iron Company, Cleveland, pig metal.

Dover Fire Brick Company, Canal Dover, fire clay.

Central Ohio Salt Company, Columbus, salt.

Otis Iron and Steel Company, Cleveland, Sieman-Martin steel boiler-plate.

C. C. Carpenter, Kelley's Island, geological specimens.

Ohio River Salt Company, Pomeroy, salt.

Mahoning Valley Centennial Association, Youngstown, iron ores, coal and pig iron.

Hanging Rock Region, Portsmouth, pig iron.

Ohio Centennial Commission, building stone.

Ohio Centennial Commission, coals.

Marietta, Pittsburgh and Cleveland Railroad, coal and iron ores.

Berea Stone Company, Berea, sandstone.

J. Park Alexander, Akron, fire clay, pottery, etc.

Amherst Stone Company, sandstone.

State of Ohio—1. For a State building on the Centennial grounds, of excellent design and workmanship, constructed with materials exclusively from Ohio, and by workmen from that State, and containing contributions of building stone from nearly every quarry in the State, with glass made from Ohio sandstone.

2. For a large collection, by the State Archæological Society, of mound-builders' remains, and other antiquities relating to pre-historic man.

3. For a large collection of the vast mineral resources of the State, with their primary derivations, and especially from the Hanging Rock iron region, the Tuscarawas, Mahoning, Hocking Valley, and Perry county coal and iron regions, also including excellent specimens of salt and bromine.

4. For a complete exhibition of the wools of the State.

5. For an extensive exhibition of the cereals of the State.

6. For a complete display of many varieties of fruits from twenty-four different counties.

7. For an exceedingly interesting exhibition of the educational system of the State, embracing all departments of education.

8. For a large, elaborate, and exceedingly valuable geological map of Ohio, with many excellent features, deserving special commendation.

9. For the magnitude of the collection of building stone, its representative character and its good quality, furnished by the following parties:

A. O. Hoffman and William Thompson, Springfield; Berea Stone Company, Berea; J. R. Hurst, Cleveland; O. D. Ford, Cleveland; L. Halderman & Son, Cleveland; John Wagner, Cleveland; Amherst Stone Company, Cleveland; Black River Stone Company, Cleveland; John Paul & Co., Massillon; Wilson & Hughes Stone Company, Cleveland; Clough Stone Company, Amherst; Worthington & Son, Amherst; Ohio Stone Company, Cleveland; J. McDermott & Co., Cleveland; Coshocton Stone Company, Coshocton; Stitt, Price & Co., Columbus; M. Finnegan, Cincinnati; J. H. Finnegan, Cincinnati; R. M. Montgomery, Youngstown; Caldwell & Todd, Youngstown; Byers & McIlhaney, Youngstown; Mauser & Haid, Youngstown; Homer Hamilton, Youngstown; Warthorst & Co., Massillon; Z. S. Stocking, Mansfield; Marcus Bosler, Dayton; William Huffman, Dayton.

10. For the fine exhibits of coals from the State, especially the block-coal from the Mahoning district, which is very fine, and largely used in a raw state for iron smelting; that from the Hocking valley and Hanging Rock districts, used for smelting and domestic purposes; the open-burning coal of the Steubenville district, well adapted for coke; that from the Massillon district, for iron smelting and domestic use; and that of the Pomeroy district, well adapted for steam purposes.

11. Ohio State building (second award) for the handsome and artistic manner in which the building stones of the State are combined.

GROUP II.

N. U. Walker & Co., Wellsville, glazed sewer pipes.

Laughlin Bros., East Liverpool, white granite wares.

Dover Fire Brick Company, Canal Dover, fire brick.

S. P. Sallandrouze, Cincinnati, silvering of large plate glass.

La Belle Glass Company, Bridgeport, glass table wares, moulded.

Brunt, Bloor, Martin and Co., East Liverpool, white granite wares.

J. P. Alexander, Akron, fire brick.

GROUP III.

Ohio River Salt Company, Pomeroy, salt.
Barber Match Company, Akron, drawing room and parlor matches.
Joseph Tromherz, Cincinnati, inks.
William J. M. Gordon, Cincinnati, glycerine.
Hartman, Laist & Co., Cincinnati, glycerine.
Kokosing Oil Company, Gambier, lampblack.
Charles Moser, Cincinnati, colors and lakes.
John J. Juhler, Pomeroy, bromine.
Blymyer Manufacturing Company, Cincinnati, machinery for sugar production.
T. D. Townley, Cincinnati, gas machine.
Gest & Atkinson, Cincinnati, animal, vegetable, and mineral oil and candles.
Lorenz Bros., Toledo, toilet articles and pomades.

GROUP IV.

Andrew Erkenbrecker, Cincinnati, starch.
J. J. Wood & Co., Columbus, starch.
James Morrison & Co., Cincinnati, canvassed hams.
Homer Baldwin, Youngstown, flour from winter wheat.
F. Schumaker and & Co., Akron, flour from winter wheat.
Snider Bro. & Co., Cincinnati, cream crackers.
Evans, Lippincott & Cunningham, Cincinnati, canvassed hams.
S. Davis, jr., Cincinnati, hams of cured pork.
Charles Jacobs, Cincinnati, sugar cured hams.
Wehrle, Werk & Sons, Middle Bass Island, wine.
Kelley Island Wine Company, Kelley's Island, wine.
Gilt Edge Butter Company, Cleveland, metallic lined butter packages.
John Bergman, Homeworth, cheese, imitation Switzer-kase.
F. Tuchfarber, Cincinnati, metallic iron show cards.
W. H. Mills, Sandusky, wine.
Work & Son, Cincinnati, Wine.
M. Work & Sons, Cincinnati, wine.

GROUP V.

Charles Durg, Cincinnati, specimens of lake fish.
J. H. Klippart, Columbus, lake fish.
Kelsey & Hosmer, Sandusky, fish dressing machine.
D. H. Shaffer, Cincinnati, mother of pearls from the American unios.
Dr. C. A. Miller, Cincinnati, mother of pearl unios.

GROUP VI.

C. B. Evans & Co., Cincinnati, cast iron marbleized mantels.
Wood, Perry & Co., Cleveland, white pine lumber.
Myers, Uhl & Co., Cleveland, marble mantel.

GROUP VII.

Delaware Chair Co., Delaware, double cane or rattan chairs.
W. O. Taylor & Son, Bedford, double cane seat chairs and rockers.
J. C. Gove, Cleveland, washing machines.

Pope Bros. & Kugeman, Cincinnati, mouldings of gilt, walnut, and other articles.
A. W. Jennings, Bedford, washing machines.
Halm, Bellows & Butler, Columbus, furniture.
School of Design of the University of Ohio, Cincinnati, ornamental carving.
F. & H. Schroeder, Cincinnati, gothic carved oak pulpit.

GROUP VIII.

Sidney D. Maxwell, Cincinnati, reports and statistics.

GROUP IX.

Henry Fox, Urbana, stocking yarns, tweeds, etc.
Beckman & Co., Cleveland, wool shoddies.
Shaler & Benninghofen, Hamilton, felts.
W. W. Jamison, Cadiz, merino wool.
E. J. Hiatt & Sons, Chester Hill, wool.
Walter Craig, Cadiz, wool.
J. B. Jamison, Cadiz, wool.
H. Boyles, Cadiz, merino wool.
J. H. Holmes, Short Creek, merino wool.
W. B. Low, Connotton, merino wool.
S. S. Campbell, Cadiz, wool.
Isaac Thomas, Short Creek, wool.
Andrew Jamison, Short Creek, merino wool.
W. O. Harrah, Cadiz, merino wool.
M. L. Birney, Bowerstown, wool.
Albert Quigley, Cadiz, merino wool.
J. M. Kirkpatrick, Utica, merino wool.
William Caskey, Harrison county, wool.
Piqua Woolen Mills, Piqua, felts.

GROUP X.

M. C. Lilley & Co., Columbus, masonic goods and society supplies.
Miss Lizzie Todd, Columbus, embroidery.

GROUP XII.

E. & D. Nepper, Cincinnati, oak sole leather, slaughter hides.
Keppendorf & Hart, Cincinnati, women's and misses', etc., machine lined work.
Stribley & Co., Cincinnati, women's and misses' medium grade machine lined boots.
Henry Freibely, Cincinnati, oak tanned harness leather.
Lewis C. Bardes, Cincinnati, oak tanned harness and leather.
Henry Kessler, Cincinnati, oak sole leather, slaughter hides.
Elsass & Pritz, Cincinnati, oak sole leather, slaughter hides.
Lang & Warner, Cincinnati, oak sole leather.
Michael Eckert, Cincinnati, oak sole leather, slaughter hides.
Martin & Riedle, Cincinnati, oak tanned harness hog skin leather.

GROUP XIII.

Methodist Book Concern, Cincinnati, books.
John Holland, Cincinnati, gold pens.

Cleveland Paper Box Machine Co., Cleveland, machine for making paper boxes.
George Tangerman, Hamilton, roofing and carpet paper.
Sanford & Co., Cleveland, blank books.
F. Tuchfarber & Co., Cincinnati, enameled iron show cards.

GROUP XIV.

Isaac N. Deardoff, Canal Dover, improved smoke-house stove.
Nathan U. Walker, Wellsville, sewer-pipe.
Mrs. Charlotte H. Sterling, Gambier, dish-washing and drying machine.
John Grossius, Cincinnati, patent school-house ventilating stove.
J. D. Cook, Toledo, water tank for public water supply in locations inaccessible to natural elevations of sufficient altitude to warrant reservoirs.
Dr. D. B. Sturgeon, Toledo, American depurating bath.
Cleveland Non-Explosive Lamp Co., Cleveland, general kerosene goods, metallic safety-lamp, and nickel plating.

GROUP XV.

Ohio Tool Co., Columbus, planes, bench-screws, chisels, draw-knives, etc.
Union Steel Screw Co., Cleveland, wood screws made from brass and steel.
Post & Co., Cincinnati, padlocks, car and door locks, hinges, etc.
William Russell, Cincinnati, horse-shoes, hand and machine made, etc.
Hall's Safe and Lock Co., Cincinnati, safes.
Sandusky Tool Co., Sandusky, carpenters', joiners', and wood turners' tools.

GROUP XVII.

S. N. Brown & Co., Dayton, wheels and wheel stock.
Peel & Elsler, Springfield, dasher moulding of steel, block or plated.
Charles Rauch, Cleveland, ice wagon.
Topliff & Ely, Elyria, flat-irons, springs, etc.
Charles Behlen, Cincinnati, child's hearse.

GROUP XVIII.

Post & Co., Cincinnati, car fittings, trimmings, etc.

GROUP XX.

Lane & Bodley, Cincinnati, steam-engine for driving saw-mill.
Armstrong Heater Manufacturing Co., Toledo, heater, lime extractor, etc.
Buckeye Engine Co., Salem, automatic cut-off and throttling steam-engines.
Toledo Pump Co., Toledo, wooden pumps.
H. & F. Blandy, Zanesville, engines.
James Leffel & Co., Springfield, double turbine water wheel.
Stillwell and Bierce Manufacturing Co., Dayton, double turbine water wheel.
Stout, Mills & Temple, Dayton, turbine wheels.
Stillwell and Bierce Manufacturing Co., Dayton, lime extracting heater and filter.
Griffith & Wedge, Zanesville, vertical portable engine.
Carlisle & Elliott, Steubenville, safety-lock for elevators.
Union Brass Works, Cincinnati, lubricators, valves, etc.
Aultman, Miller & Co., Akron, self-registering dynamometer.
Fred. Lunenheimer, Cincinnati, lubricator oil cup steam valves.
Wm. Powell & Co., Cincinnati, valves, etc.

GROUP XXI.

A. M. Benson, Cleveland, stave jointer.
J. A. Fay & Co., Cincinnati, wood working machinery.
Peter Gerlach & Co., Cleveland, stave sawing machine.
Lane & Bodley, Cincinnati, portable circular saw-mill.
Lane & Bodley, Cincinnati, stroke power mortisers.
Silver & Deming, Salem, nut boxing and spoke tenoning machine, hollow auger.
Bentel, Margedant & Co., Hamilton, band and gig-saws and planing machine.

GROUP XXII.

Franz & Pope Knitting Machine Company, Bucyrus, family knitting machine.

GROUP XXIII.

Mansfield Machine Works, Mansfield, portable farm engine.
Huber Manufacturing Company, Marion, revolving rake or hay collector.
Whitely, Fassler & Kelley, Springfield, sweep-rake reaper.
P. P. Mast & Co., Springfield, corn cultivator, Buckeye plow and sulky, cooking apparatus.
Warder, Mitchell & Co., Springfield, Champion self-raker and reaper.
Blymyer Manufacturing Company, Cincinnati, sugar machinery.
Russell & Co., Massillon, eight-horse-power threshing machine.
Huber Manufacturing Company, Marion, road scraper.
Rhodes & Waters, Elyria, Eureka post-hole digger.
H. H. Roe & Co., Madison, dairy appliances.
Brown, Hinman & Co., Columbus, hoes, forks, etc.
D. E. McSherry & Co., Dayton, rice drill.
J. F. Sieberling, Akron, mower.
Geo. W. Rue, Hamilton, potato digger, cultivator, hoes, etc.
Haworth Planter Company, London, corn planting apparatus.
C. Sedgebeer & Miller, Painesville, feed and corn mills.
J. H. Thomas & Sons, Springfield, horse rake.
C. Aultman & Co., Canton, table rake and reaper, combined.
Aultman, Miller & Co., Akron, improved Buckeye reaper.
Barnard Cortrite, Norwalk, Eureka fanning mill.
McSherry & Co., Dayton, grain and small seed drill.
Farmers' Friend Company, Dayton, grain and small seed drill.
C. Aultman & Co., Canton, mowing machine (Buckeye).
Warder, Mitchell & Co., Springfield, mowing machines.
Champion Machine Company, Springfield, combined mower and reaper.
C. Russell & Co., Canton, mowing machine and reaper, combined (Peerless).
Clegg, Wood & Co., Dayton, horse rake.
Silver & Deming, Salem, chaff cutters.
J. A. Treat, Cleveland, self-opening carriage gate.
Whitman & Miles Manufacturing Company, Akron, mowing and reaping machine knives.
P. P. Mast & Co., Springfield, cider mill and press.
Champion Machine Company, Springfield, self-raking reaper.
Ludlow & Rogers, Springfield, cider mill and press.
S. D. Foot, Springfield, steam fruit cooking apparatus.

Blymyer Manufacturing Company, Cincinnati, fixed horizontal engine.
Milburn Wagon Company, Toledo, farm wagons.
P. P. Mast, Springfield, Buckeye plow and sulky.

GROUP XXIV.

J. I. Wood, Toledo, splint for leg and thigh.

GROUP XXV.

Henry M. Weaver, Mansfield, automatic gravity platform scale.
Vanduzen & Tift, Cincinnati, church bells and smaller for common use.
Pulvermacher Galvanic Company, Cincinnati, galvanic chains, belts, etc.

GROUP XXVI.

Garry Iron Roofing Company, Cleveland, iron roofing.
Champion Iron Fence Company, Kenton, iron fence.

GROUP XXVII.

J. F. Ryder, Cleveland, photographs.
School of Design, Cincinnati, wood carving.
School of W. H. Fry, Cincinnati, wood carving.
I. Landy, Cincinnati, photographs.

GROUP XXVIII.

Wilson, Hinkle & Co., Cincinnati, books.
Mrs. E. G. Wormley, Columbus, microscopic illustrations of micro-chemistry of Porsino.
A. J. Rickoff, Superintendent, Cleveland, plan of public school building.
Sandusky City schools, Sandusky, pupils' work.
Department of Public Schools of Ohio, public school system and work.
Dayton schools, Dayton, pupils' work.
Columbus schools, Columbus, pupils' work.
Cleveland schools, Cleveland, drawing.
Cincinnati School of Design, Cincinnati, pupils' work.
Cincinnati public schools, Cincinnati, writing and industrial drawing.

GROUP XXIX.

Mrs. Jane Watson, Massillon, mosses.

GROUP XXX.

H. M. Cryer, Salem, horse.

GROUP XXXII.

E. J. Hiatt & Bros., Chester Hill, Morgan county:
3 yearling ewes, American Merino.
4 ewes and 1 ram, "
3 breeding ewes, "

American Merino ram "Kendrick," 3 years old.
" " " "Buckeye," 5 "
" ram, "Target," 1 "
" " "Keystone," 1 "

GROUP XXXIV.

E. M. Gillespie, Columbus, pointer bitches over fifty pounds.

GROUP XXXV.

William H. Todd, Vermillion, poultry.
William H. Todd, " variety of fowl.
William H. Todd, " fowls.
William H. Todd, " "
Mosgrove Broadwels, Urbana, variety of chickens.
W. H. Todd, Vermillion, geese.
W. H. Todd, " ducks.

GROUP XXXVI.

Ohio Horticultural Society, M. B. Bateham, Secretary, Painesville, collection of apples.
Dr. John A. Warder, President Ohio Horticultural Society, Cincinnati, early apples.
George W. Campbell, Delaware, grapes.
Morgan Brown, Tontogany, Wood county, collection of vegetables.
F. S. Cary, Hamilton, apples.
H. Acosta Kresken, Cincinnati, paper fruit and flower models.

FLOUR MILLING MACHINERY.

M. Deal & Co., Bucyrus, smutter and separator, combined.
Turner, Parks & Co., Cuyahoga Falls, middlings purifier, separator, and scourers.

SPECIAL GROUP OF MACHINERY USED BY BUREAU OF MACHINERY.

P. P. Mast & Co., Springfield, two 200-horse-power Anderson boilers.
P. P. Mast & Co., " saw-mill and agricultural hall.
Stillwell & Bierce, Dayton, heater No. 4, boiler-house.
Buckeye Engine Company, Springfield, engine No. 3, annex.
Armstrong Heater Company, Toledo, heater No. 6, boiler-house.

OHIO.

AN ADDRESS DELIVERED AT THE CENTENNIAL EXHIBITION, IN PHILADELPHIA, AUGUST 9, 1876, BY EDWARD D. MANSFIELD, LL.D.*

One hundred years ago, the whole territory from the Allegheny to the Rocky Mountains was a wilderness, inhabited only by wild beasts and Indians. The Jesuit and Moravian Missionaries were the only white men who had penetrated the wilderness or beheld its mighty lakes and rivers. While the thirteen old colonies were declaring their independence, the thirteen new States which now lie in the western interior had no existence, and gave no sign of the future. The solitude of nature was unbroken by the steps of civilization. The wisest statesman had not contemplated the probability of the coming States, and the boldest patriot did not dream that this interior wilderness should soon contain a greater population than the thirteen old States with all the added growth of one hundred years.

Ten years after that the old States had ceded their western lands to the General Government, and the Congress of the United States had passed the ordinance of 1785 for the survey of the public territory, and in 1787 the celebrated ordinance which organized the North-western Territory, and dedicated it to freedom and intelligence.

Fifteen years after that, and more than a quarter of a century after the Declaration of Independence, the State of Ohio was admitted into the Union, being the seventeenth which accepted the Constitution of the United States. It has since grown up to be great, populous, and prosperous under the influence of those ordinances. At her admission, in 1803, the tide of migration had begun to flow over the Alleghenies into the Valley of the Mississippi, and although no steamboat, no railroad, then existed, nor even a stage coach helped the immigrant, yet the wooden "ark" on the Ohio, and the heavy wagon slowly winding over the mountains, bore these tens of thousands to the wilds of Kentucky and the plains of Ohio. In the spring of 1788—the first year of settlement—

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*The reader of the following address will see that a large part of it is a statement of facts, which depend for their accuracy on the accuracy of statistics examined. In order that these may not be doubted, however strong the statements may seem, I subjoin the principal authorities for the facts I have cited:

1. The United States Census for 1870.
2. Statistics of Ohio for 1875.
3. Geological Report of Ohio for 1834.
4. Geological Report of Ohio for 1873.
5. Coal Regions of America (McFarlane).
6. McCullough's Account of the British Empire.
7. McGregor's Statistics of Europe.
8. U. S. Report on Commerce and Navigation.
9. Report of Commissioner of Schools in Ohio for 1875.
10. Report of Cincinnati Chamber of Commerce.

The results stated in the address have been carefully calculated and deduced from these authorities, and are only incomplete in not being as fully illustrated as they might have been.

E. D. M.

MORROW, OHIO, September 20, 1876.

4,500 persons passed the mouth of the Muskingum in three months, and the tide continued to pour on for half a century in a widening stream, mingled with all the races of Europe and America, until now, in the hundredth year of America's independence, the five States of the Northwestern Territory, in the wilderness of 1776, contain ten millions of people, enjoying all the blessings which peace and prosperity, freedom and Christianity, can confer upon any people. Of these five States, born under the ordinance of 1787, Ohio is the first, oldest, and in many things the greatest State in the American Union. In some things it is the greatest State in the Union. Let us then attempt, in the briefest terms, to draw an outline portrait of this great and remarkable commonwealth.

Let us observe its physical aspects. Ohio is just one-sixth part of the Northwestern Territory—40,000 square miles. It lies between Lake Erie and the Ohio River—having 200 miles of navigable waters—on one side flowing into the Atlantic Ocean, and on the other into the Gulf of Mexico. Through the Lakes its vessels touch on six thousand miles of interior coast, and through the Mississippi, on thirty-six thousand miles of river coast; so that a citizen of Ohio may pursue his navigation through forty-two thousand miles, all in his own country, and all within navigable reach of his own State. He who has circumnavigated the globe has gone but little more than half the distance which the citizen of Ohio finds within his natural reach in this vast interior.

Looking upon the surface of this State, we find no mountains, no barren sands, no marshy wastes, no lava-covered plains, but one broad, compact body of arable land, intersected with rivers, and streams, and running waters, while the beautiful Ohio flows tranquilly by its side. More than three times the surface of Belgium, and one-third of the whole of Italy, it has more natural resources in proportion than either, and is capable of ultimately supporting a larger population than any equal surface in Europe. Looking from this great arable surface, where upon the very hills the grass and the forest trees now grow exuberant and abundant, we find that underneath this surface, and easily accessible, lie 10,000 square miles of coal, and 4,000 square miles of iron—coal and iron enough to supply the basis of manufacture for a world! All this vast deposit of metal and of fuel does not interrupt or take from that arable surface at all. There you may find in one place the same machine bringing up coal and salt water from below, while the wheat and the corn grow upon the surface above. The immense masses of coal, iron, salt, and freestone deposited below have not in any way diminished the fertility and production of the soil.

It has been said by some writer that the character of a people is shaped or modified by the character of the country in which they live. If the people of Switzerland have acquired a certain air of liberty and independence from the rugged mountains around which they live, if the people of Southern Italy or beautiful France have acquired a tone of ease and politeness from their mild and genial clime, so the people of Ohio, placed amidst such a weal h of nature in the temperate zone, should show the best fruits of peaceful industry and the best culture of Christian civilization. Have they done so? Have their own labor and arts and culture come up to the advantages of their natural situation? Let us examine this growth and their product.

The first settlement of Ohio was made by a colony from New England at the mouth of the Muskingum. It was literally a remnant of the officers of the Revolution. Of this colony no praise of the historian can be as competent or as strong as the language of Washington. He says, in answer to inquiries addressed to him: "No colony in America was ever settled under such favorable auspices as that which has first commenced at the Muskingum. Information, property, and strength will be its characteristics. I know many of the settlers personally, and there never were men better calculated to promote

the welfare of such a community;" and he adds, that if he were a young man, he knows no country in which he would sooner settle than in this western region.* This colony, left alone for a time, made its own government and nailed its laws to a tree in the village, an early indication of that law-abiding and peaceful spirit which has since made Ohio a just and well-ordered community. The subsequent settlements on the Miami and Scioto were made by citizens of New Jersey and Virginia, and it is certainly remarkable that among all the early immigration there were no ignorant people. In the language of Washington, they came with "information"—qualified to promote the welfare of the community.

Soon after the settlements on the Muskingum and the Miami, the great wave of migration flowed on to the plains and valleys of Ohio and Kentucky. Kentucky had been settled earlier, but the main body of immigrants in subsequent years went into Ohio, influenced partly by the great ordinance of 1787, securing freedom and schools forever, and partly by the greater security of titles under the survey and guarantee of the United States Government. Soon the new State grew up, with a rapidity which, until then, was unknown in the history of civilization. On the Muskingum, where the buffalo had roamed; on the Scioto, where the Shawnees had built their towns; on the Miami, where the great chiefs of the Miamis had reigned; on the plains of Sandusky, yet red with the blood of the white man; on the Maumee, where Wayne, by the victory of the "Fallen Timbers," had broken the power of the Indian confederacy, the immigrants from the old States and from Europe came in to cultivate the fields, to build up towns, and to rear the institutions of Christian civilization, until the single State of Ohio is greater in numbers, wealth, and education, than was the whole American Union when the Declaration of Independence was made.

Let us now look at the statistics of this growth and magnitude, as they are exhibited in the censuses of the United States. Taking intervals of twenty years, Ohio had:

In 1810	45,365
In 1830	937,903
In 1850	1,980,329
In 1870	2,665,260

Adding to the increase of population in the last six years, and Ohio now has, in round numbers, three millions (3,000,000) of people—half a million more than the thirteen States in 1776; and her cities and towns have to-day six times the population of all the cities of America one hundred years ago. This State is now the third in numbers and wealth, and the first in some of those institutions which mark the progress of mankind. That a small part of the wilderness of 1776 should be more populous than the whole Union was then, and that it should have made a social and moral advance greater than that of any nation in the same time, must be regarded as one of the most startling and instructive facts which attend this year of commemoration. If such has been the social growth of Ohio, let us look at its physical development. This is best expressed by the aggregate productions of the labor and arts of a people applied to the earth. In the census statistics of the United States these are expressed in the aggregate results of agriculture, mining, manufactures, and commerce. Let us simplify these statistics by comparing the aggregates and ratios as between several States, and between Ohio and some countries of Europe.

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*Spark's Washington, 8th Vol., 38th Page.

The aggregate amount of grain and potatoes—farinaceous food—produced in Ohio in 1870, was 134,938,413 bushels, and in 1874 they were 157,323,597 bushels, being the largest aggregate amount raised in any State but one, Illinois, and larger per square mile than Illinois, or any other State in the country. The promises of nature were thus vindicated by the labor of man; and the industry of Ohio has fulfilled its whole duty to the sustenance of the country and the world. She has raised more grain than ten of the old States together, and more than half raised by Great Britain or by France. I have not the recent statistics of Europe, but McGregor, in his Statistics of Nations for 1832—a period of profound peace—gives the following ratios for the leading countries of Europe:

	Area—miles.	Am't of grain—bushels.	Rate per sq. mile.
Great Britain	120,324	262,500,000	2,190 to 1
Austria	258,603	366,800,000	1,422 "
France	215,858	233,847,300	1,080 "
The State of Ohio	40,000	150,000,000	3,750 "

Combining the great countries of Great Britain, Austria, and France, we find that they had 594,785 square miles, and produced 863,147,300 bushels of grain, which was, at the time these statistics were taken, 1,450 bushels per square mile, and ten bushels to each one of the population. Ohio, on the other hand, had 3,750 bushels per square mile, and fifty bushels to each one of the population; that is, there was five times as much grain raised in Ohio, in proportion to the people, as in these great countries of Europe. As letters make words, and words express ideas, so these dry figures of statistics express facts, and those facts make the whole history of civilization.

Let us now look at the statistics of domestic animals. These re always indicative of the state of society in regard to the physical comforts. The horse must furnish domestic conveyances, the cattle must furnish the products of the dairy, as well as meat, and the sheep must furnish wool.

Let us see how Ohio compares with other States and with Europe. In 1870, Ohio had 8,818,000 domestic animals; Illinois, 6,925,000; New York, 5,283,000; Pennsylvania, 4,493,000, and other States less. The proportion to population in these States was:

In Ohio, to each person	3.3
In Illinois, "	2.7
In New York "	1.2
In Pennsylvania,"	1.2

Let us now see the proportion of domestic animals in Europe. The results given by McGregor's statistics are:

In Great Britain, to each person	2.44
In Russia, "	2.00
In France, "	1.50
In Prussia, "	1.02
In Austria, "	1.00

It will be see that the proportion in Great Britain is only two-thirds that of Ohio; in France only one-half; and in Austria and Prussia only one-third. It may be said that in the course of civilization, the number of animals diminish as the density of population increases; and, therefore, this result might have been expected in the old countries of Europe. But this does not apply to Russia or Germany, still less to other States in

this country. Russia in Europe has not more than half the density of population than in Ohio. Austria and Prussia have less than 150 to the square mile. The whole of the north of Europe has not so dense a population as the State of Ohio, still less have the States of Illinois and Missouri, west of Ohio. Then, therefore, Ohio showing a larger proportion of domestic animals than the north of Europe, or States west of her with a population not so dense, we see at once there must be other causes to produce such a phenomena.

Looking to some of the incidental results of this vast agricultural production, we see that the United States exports to Europe immense amounts of grain and provisions; and that there is manufactured in this country an immense amount of woolen goods. Then, taking these statistics of the raw material, we find that Ohio produces *one-fifth* of all the wool; *one-seventh* of all the cheese; *one-eighth* of all the corn, and *one-tenth* of all the wheat; and yet Ohio has but a *fourteenth* part of the population, and *one-eightieth* part of the surface of this country.

Let us take another—a commercial view of this matter. We have seen that Ohio raises five times as much grain per square mile as is raised per square mile in the empires of Great Britain, France, and Austria taken together. After making allowance for the differences of living in the working classes of this country, at least two-thirds of the food and grain of Ohio are a surplus beyond the necessities of life, and therefore so much in the commercial balance of exports. This corresponds with the fact that in the shape of grain, meat, liquors, and dairy products, this vast surplus is constantly moved to the Atlantic States and to Europe. The money value of this exported product is equal to $100,000,000 per annum, and to a solid capital of fifteen hundred millions of dollars ($1,500,000,000) after all the sustenance of the people has been taken out of the annual crop.

We are speaking of agriculture alone. We are speaking of a State which began its career more than a quarter of a century after the Declaration of Independence was made. And now it may be asked what is the real cause of this extraordinary result, which, without saying anything invidious of other States, we may safely say has never been surpassed in any country? We have already stated two of the advantages possessed by Ohio. The first is that it is a compact, unbroken body of arable land, surrounded and intersected by water-courses, equal to all the demands of commerce and navigation. Next, that it was secured forever to freedom and intelligence by the ordinance of 1787. The intelligence of its future people was secured by immense grants of public lands for the purposes of education; but neither the blessings of nature nor the wisdom of laws could obtain such results without the continuous labor of an intelligent people. Such it had, and we have only to take the testimony of Washington, already quoted, and the statistical results I have given, to prove that no people has exhibited more steady industry, nor has any people directed their labor with more intelligence.

After the agricultural capacity and production of a country, its most important physical feature is its mineral products—its capacity for the production of coal and iron, the two great elements of material civilization. If we were to take away from Great Britain her capacity to produce coal in such vast quantities, we should reduce her to a third-rate position, no longer numbered among the great nations of the earth. Coal has smelted her iron, run her steam engines, and is the basis of her manufactures. But when we compare the coal fields of Great Britain with those of this country they are insignificant. The coal fields of all Europe are small compared with those of the central United States. The coal district of Durham and Northumberland in England is only 880 square miles. There are other districts of smaller extent, making in the whole

probably one-half the extent of that in Ohio. The English coal beds are represented as more important, in reference to extent, on account of their thickness. There is a small coal district in Lancashire where the workable coal beds are in all 150 feet in thickness. But this involves, as is well known, the necessity of going to immense depths and incurring immense expense. On the other hand, the workable coal beds of Ohio are near the surface, and some of them require no excavating, except that of the horizontal lead from the mine to the river or the railroad. In one county of Ohio there are three beds of twelve, six, and four feet each, within fifty feet of the surface. At some of the mines having the best coal the lead from the mine is nearly horizontal, and just high enough to dump the coal into the railroad cars. These coals are of all qualities, from that adapted to the domestic fire to the very best qualities for smelting or manufacturing iron. Recollecting these facts, let us try to get an idea of the coal district of Ohio. The bituminous coal region descending the western slopes of the Alleghenies occupies large portions of western Pennsylvania, West Virginia, Ohio, Kentucky, and Tennessee. I suppose that this coal field is not less than 50,000 square miles, exclusive of western Maryland and the southern terminations of that field in Georgia and Alabama. Of this vast field of coal, exceeding any thing found in Europe, about one-fifth part lies in Ohio. Professor Mather, in his report on the geology of the State (first Geological Report of the State), says:

"The coal measures within Ohio occupy a space of about 180 miles in length by 80 in breadth at the widest part, with an area of about 10,000 square miles, extending along the Ohio from Trumbull county in the north to near the mouth of the Scioto in the south. The regularity in the dip, and the moderate inclination of the strata, afford facilities to the mines not known to those of most other countries, especially Great Britain, where the strata in which the coal is imbedded have been broken and thrown out of place since its deposit, occasioning many slips and faults, and causing much labor and expense in again recovering the bed. In Ohio there is very little difficulty of this kind, the faults being small and seldom found."

Now, taking into consideration these geological facts, let us look at the extent of the Ohio coal field. It occupies, wholly or in part, thirty-six counties, including, geographically, 14,000 square miles; but leaving out fractions, and reducing the Ohio coal field within its narrowest limits, it is 10,000 square miles in extent, lies near the surface, and has on an average twenty feet thickness of workable coal beds. Let us compare this with the coal mines of Durham and Northumberland (England), the largest and best coal mines there. That coal district is estimated at 850 square miles, twelve feet thick, and is calculated to contain nine billions (that is, nine thousand millions) of tons of coal. The coal field of Ohio is twelve times larger and one-third thicker. Estimated by that standard, the coal field of Ohio contains 180 billions (one hundred and eighty thousand millions) of tons of coal. Marketed at only $2.00 per ton, this coal is worth $360,000,000,000 (three hundred and sixty thousand millions of dollars), or, in other words, ten times as much as the whole valuation of the United States at the present time. But we need not undertake to estimate either its quantity or value. It is enough to say that it is a quantity which we can scarcely imagine, which is tenfold that of England, and which is enough to supply the entire continent for ages to come.

After coal, iron is beyond doubt the most valuable mineral product of a State. As the material of manufacture, it is the most important. What are called the "precious metals" are not to be compared with it as an element of industry or of profit. But since no manufactures can be successfully carried on without fuel, coal becomes the firs

material element of the arts. Iron is unquestionably the next. Ohio has an iron district extending from the mouth of the Scioto river to some point north of the Mahoning river in Trumbull county. The whole length is near 200 miles and the breadth 20 miles, making, as nearly as we can ascertain, 4,000 square miles. The iron in this district is of various qualities, and is manufactured largely into bars and castings. In this iron district are 100 furnaces, 44 rolling mills, and 15 rail mills, being the largest number of either in any State of the Union, except only Pennsylvania.

Although only the seventeenth State in its admission, I find that by the census statistics of 1870, it is the third State in the production of iron and iron manufactures. Already, and within the life of one man, this State begins to show what must in future time be the vast results of coal and iron applied to the arts and manufactures. In the year 1874 there were 420,000 tons of pig iron produced in Ohio, which is larger than the product of any State except Pennsylvania. The product and the manufacture of iron in Ohio have increased so rapidly, and the basis for increase is so great, that we may not doubt that Ohio will continue to be the greatest producer of iron and iron fabrics except only Pennsylvania. At Cincinnati the iron manufacture of the Ohio Valley is concentrating, and at Cleveland the ores of Lake Superior are being smelted.

After coal and iron, we may place *salt* among the necessaries of life. In connection with the coal region, west of the Alleghenies, there lies in Pennsylvania, West Virginia, and Ohio a large space of country underlaid by the salt rock, which already produces immense amounts of salt. Of this, Ohio has its full proportion. In a large section of the south-eastern portion of the State salt is produced without any known limitation. At Pomeroy and other points the salt rock lies about one thousand feet below the surface, but salt water is easily brought to the surface by the steam engine. There, the salt rock, the coal seam, and the noble sandstone lie in successive strata, while the green corn and the yellow wheat blooms on the surface above. The State of Ohio produced in 1874 three million five hundred thousand (3,500,000) bushels of salt, being one-fifth of all produced in the United States. The salt section of Ohio is exceeded alone by that of Syracuse, New York, and of Saginaw, Michigan. There is no definite limit to the underlying salt rock of Ohio, and, therefore, the production will be proportioned only to the extent of the demand.

Having now considered the resources and the products of the soil and the mines in Ohio, we may properly ask how far have the people employed their resources in the increase of art and manufacture? We have two modes of comparison: the ratio of increase within the State, and the ratio they bear to other States. The aggregate value of the products of manufacture, exclusive of mining, in the last three censuses were:

In 1850	$62,692,000 00
In 1860	121,691,000 00
In 1870	269,713,000 00

The ratio of increase was over one hundred per cent. in each ten years, a ratio far beyond that of the increase of population, and much beyond the ratio of increase in the whole country. In 1850, the manufactures of Ohio were one sixteenth part of the aggregate in the country; in 1860, one-fifteenth part; in 1870, one-twelfth part. In addition to this, we find from the returns of Cincinnati and Cleveland, that the value of the manufactured products of Ohio in 1875 must have reached four hundred million dollars ($400,000,000), and by reference to the census tables, it will be seen that the ratio of increase exceeded that of the great manufacturing States of New York, Massachusetts, and Connecticut. Of all the States admitted into the Union prior to Ohio, Pennsylvania.

alone has kept pace in the progress of manufacture. Some little reference to the manufacture of leading articles may throw some light on the cause of this. In the production of agricultural machinery and implements, Ohio is the first State; in animal and vegetable oils, the second; in pig iron, the second; in cast iron, the third; in tobacco, the third; in salt, the fourth; in machinery, the fourth; and in leather, the fourth. These facts show how largely the resources of coal, iron, and agriculture have entered into the manufactures of the State. This great advance in the manufactures of Ohio, when we consider that this State is relatively to its surface the first agricultural State in the country, leads to the inevitable inference that its people are remarkably industrious. When on forty thousand square miles of surface, three millions of people raise one hundred and fifty million bushels of grain, and produce manufactures to the amount of $269,000,000 (which is fifty bushels of breadstuff to each man, woman, and child, and one hundred and thirty-three dollars of manufacture), it will be difficult to find any community surpassing such results. It is a testimony not merely to the State of Ohio, but to the industry, sagacity, and energy of the American people.

Looking now to the commerce of the State, we have said there are six hundred miles of coast line, which embraces some of the principal internal ports of the Ohio and the lakes, such as Cincinnati, Cleveland, Toledo, and Portsmouth, but whose commerce is almost wholly inland. Of course, no comparison can be made with the foreign commerce of the ocean ports. On the other hand, it is well known that the inland trade of the country far exceeds that of all its foreign commerce, and that the largest part of this interior trade is carried on its rivers and lakes. The materials for the vast consumption of the interior must be conveyed in its vessels, whether of sail or steam, adapted to these waters. Let us take, then, the ship building, the navigation, and the exchange trades of Ohio as elements in determining the position of this State in reference to the commerce of the country. At the ports of Cleveland, Toledo, Sandusky, and Cincinnati there had been built one thousand sail and steam vessels in the last twenty years, making an average of fifty each year. The number of sail, steam, and all kinds of vessels in Ohio is eleven hundred and ninety, which is equal to the number in all other States in the Ohio Valley and the Upper Mississippi.

When we look to the navigable points to which these vessels are destined, we find them on all this vast coast line, which extends from the Gulf of Mexico to the Yellowstone, and from Duluth to the St. Lawrence.

Looking again to see the extent of this vast interior trade which is handled by Ohio alone, we find that the imports and exports of the principal articles of Cincinnati amount in value to five hundred millions of dollars ($500,000,000); and when we look at the great trade of Cleveland and Toledo we shall find that the annual trade of Ohio exceeds seven hundred millions of dollars ($700,000,000). The lines of railroad which connect with its ports are more than four thousand miles in length, or rather more than one mile in length to each ten square miles surface. This great amount of railroads is engaged not merely in transporting to the Atlantic and thence to Europe the immense surplus grain and meat in Ohio, but in carrying the largest part of that greater surplus which exists in the States west of Ohio, the Granary of the West. Ohio holds the gateway of every railroad north of the Ohio, from the Mississippi to the Atlantic, and hence it is that the great transit lines of the country pass through Ohio.

Let us now turn from the progress of the arts to the progress of ideas; from material to intellectual development. It is said that a State consists of men, and history shows that no art or science, wealth or power, will compensate for the want of moral or intel-

lectual stability in the mind of a nation. Hence, it is admitted that the strength and perpetuity of our republic must consist in the intelligence and morality of the people. A republic can last only when the people are enlightened. This was an axiom with the early legislators of this country. Hence it was that when Virginia, Connecticut, and the original colonies ceded to the General Government that vast and then unknown wilderness which lay west of the Alleghenies, in the valleys of the Ohio and Mississippi, they took care that its future inhabitants should be an educated people. The Constitution was not formed when the celebrated ordinance of 1787 was passed. That ordinance provided that "Religion, morality, and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall be forever encouraged;" and by the ordinance of 1785 for the survey of the public lands in the Northwestern Territory, Section 16 in each township, that is, one thirty-sixth part, was reserved for the maintenance of public schools in said township. As the State of Ohio contained a little more than twenty-five millions of acres, this, together with two special grants of three townships to universities, amounted to the dedication of 740,000 acres of land to the maintenance of schools and colleges. It was a splendid endowment, but it was many years before it became available. It was sixteen years after the passage of this ordinance (in 1803), when Ohio entered the Union, and legislation upon this grant became possible. The Constitution of the State pursued the language of the ordinance, and declared that "schools and the means of education shall forever be encouraged by legislative provision." The Governors of Ohio, in successive messages, urged attention to this subject upon the people; but the thinness of settlement making it impossible, except in few districts, to collect youth in sufficient numbers, and impossible to sell or lease lands to advantage, caused the delay of any efficient school system for many years. In 1825, however, a general law establishing a school system, and levying a tax for its support, was passed.

This was again enlarged and increased by new legislation in 1836 and 1846. From that time to this, Ohio has had a broad, liberal, and efficient system of public instruction. The taxation for schools, and the number enrolled in them at different periods, will best show what has been done.

In 1855 the total taxation for school purposes was	$2,672,827
The proportion of youth of schoolable age enrolled was	67 per cent.
In 1874 the amount raised by taxation was	$7,425,135
The number enrolled of schoolable age was	70 per cent., or 707,943

As the schoolable age extends to 21 years, and as there are very few youth in school after 15 years of age, it follows that the 70 per cent. of schoolable youths enrolled in the public schools must comprehend nearly the whole number between 4 and 15 years. It is important to observe this fact, because it has been inferred that the whole number of youth between 5 and 21 are not enrolled, that, therefore, they are not educated. This is a mistake; nearly all over 15 years of age have been in the public schools, and all the native youth of the State, and all foreign born, young enough, have had the benefit of the public schools. But in consequence of the large number who have come from other States and from foreign countries, there are still a few who are classed by the census statistics among the "illiterate;" the proportion of this class, however, is less in proportion than in twenty-eight other States, and less in proportion than is Connecticut and Massachusetts, two of the oldest States, most noted for popular education. In fact, every youth in Ohio, under 21 years of age, may have the benefit of a public education; and since the system of graded, and of high schools has been adopted, may

obtain a common knowledge from the alphabet to the classics. The enumerated branches of study in the public schools of Ohio are thirty-four (34), including mathematics and astronomy, French, German, and the classics. Thus the State which was in the heart of the wilderness of 1776, and was not a State until the 19th century had begun, now presents to the world not merely an unrivaled development of material prosperity, but an unsurpassed system of popular education.

In what is called the higher education, in the colleges and universities, embracing the classics and sciences taught in regular classes, it is the popular idea, and one which few dare to question, that we must look to the Eastern States for superiority and excellence; but that also is becoming an assumption without proof; a proposition difficult to sustain. The facts in regard to the education of universities and colleges, their faculties, students, and courses of instruction are all set forth in the complete statistics of the Bureau of Education for 1874. They show that the State of Ohio had the largest number of such institutions; the largest number of instructors in their faculties, except one State, New York; and the largest number of students in regular college classes, in proportion to their population, except the two States of Connecticut and Massachusetts. Perhaps if we look at the statistics of classical students in the colleges, disregarding preparatory and irregular courses, we shall get a more accurate idea of the progress of the higher education in those States which claim the best:

	Colleges.	Teachers.	Students.	Proportion.
In Ohio	36	258	2,139	1 in 124
In Pennsylvania	27	239	2,359	1 in 150
In New York	26	343	2,764	1 in 176
In six New England States	17	252	3,341	1 in 105
In Illinois	24	219	1,701	1 in 140

This shows there are more collegiate institutions in Ohio than in all New England; a greater number of college teachers, and only a little smaller ratio of students to the population; a greater number of such students than either in New York or Pennsylvania, and as a broad, general fact, has made more progress in education than either of the old States which formed the American Union. Such a fact is a higher testimony to the strength and the beneficent influence of the American government than any which the statistician or the historian can advance.

Let us now turn to the moral aspects of the people of Ohio. No human society is found without its poor and dependent classes, whether made so by defects of nature, by acts of Providence, or by the accidents of fortune. Since no society is exempt from these classes, it must be judged not so much by the fact of their existence, as by the manner in which it treats them. In the civilized nations of antiquity, such as Greece and Rome, hospitals, infirmaries, orphan homes, and asylums for the infirm were unknown. These are the creations of Christianity, and that must be esteemed practically the most Christian State which most practices this Christian beneficence. In Ohio, as in all the States of this country, and of all Christian countries, there is a large number of the infirm and dependent classes; but although Ohio is the third State in population, she is only the fourteenth in the proportion of the dependent classes. The more important point, however, was, how does she treat them? Was there wanting any of all the varied institutions of benevolence? How does she compare with other States and countries in this respect? It is believed that no State or country can present a larger proportion of all these institutions which the benevolence of the wise and good have suggested for the alleviation of suffering and misfortune than the State of Ohio. With

3,500 of the insane within her borders, she has five great lunatic asylums, capable of accommodating them all. She has asylums for the deaf and dumb, the idiotic, and the blind. She has the best hospitals in the country. She has schools of reform and houses of refuge. She has "homes" for the boys and girls, to the number of 800, who are the children of soldiers. She has penitentiaries and jails, orphan asylums and infirmaries. In every county there is an infirmary, and in every public institution, except the penitentiary, there is a school. So that the State has used every human means to relieve the suffering, to instruct the ignorant, and to reform the criminal. There are in the State 80,000 who come under all the various forms of the infirm, the poor, the sick, and the criminal, who, in a greater or less degree, make the dependent class. For these the State has made every provision which humanity or justice or intelligence can require. A young State developed in the wilderness, she challenges, without any invidious comparison, both Europe and America to show her superior in the development of humanity manifested in the benefaction of public institutions.

Intimately connected with public morals and with charitable institutions is the religion of a people. The people of the United States are a Christian people. The people of Ohio have manifested their zeal by the erection of churches, of Sunday schools, and of religious institutions. So far as these are outwardly manifested, they are made known by the social statistics of the census. The number of church organizations in the leading States were:

In the State of Ohio	6,488
In the State of New York	5,627
In the State of Pennsylvania	5,984
In the State of Illinois	4,298

It thus appears that Ohio had a larger number of churches than any State of the Union. The number of sittings, however, were not quite as large as those in New York and Pennsylvania. The denominations are of all the sects known in this country, about thirty in number, the majority of the whole number being Methodists, Presbyterians, and Baptists. Long before the American Independence, the Moravians had settled on the Mahoning and Tuscarawas rivers, but only to be destroyed; and when the peace with Great Britain was made, not a vestige of Christianity remained on the soil of Ohio; yet we see that within ninety years from that time the State of Ohio was, in the number of its churches, the first of this great Union.

In the beginning of this address I said that Ohio was the oldest and first of these great States carved out of the North-western territory, and that it was in some things the greatest State of the American Union. I have now traced the physical, commercial, intellectual and moral features of the State during the seventy-five years of its constitutional history. The result is to establish fully the propositions with which I began. These facts have brought out:

1. That Ohio is, in reference to the square miles of its surface, the first State in agriculture of the American Union; this, too, notwithstanding it has 800,000 in cities and towns, and a large development of capital and products in manufactures.

2. That Ohio has raised more grain per square mile than either France, Austria, or Great Britain. They raised 1,450 bushels per square mile, and 10 bushels to each person. Ohio raised 3,750 bushels per square mile, and 50 bushels to each one of the population; or, in other words, five times the proportion of grain raised in Europe.

3. Ohio was the first State of the Union in the production of domestic animals, being far in advance of either New York, Pennsylvania, or Illinois. The proportion of domes-

tic animals to each person in Ohio was three and one-third, and in New York and Pennsylvania less than half that. The largest proportion of domestic animals produced in Europe was in Great Britain and Russia, neither of which come near that of Ohio.

4. The coal field of Ohio is vastly greater than that of Great Britain, and we need make no comparison with other States in regard to coal or iron; for the 10,000 square miles of coal, and 4,000 square miles of iron in Ohio are enough to s pply the whole American continent for ages to come.

5. Neither need we compare the results of commerce and navigation, since from the ports of Cleveland and Cincinnati the vessels of Ohio touch on 42,000 miles of coast, and her 5,000 miles of railroad carry her products to every part of the American continent.

6. Notwithstanding the immense proportion and products of agriculture in Ohio, yet she has more than kept pace with New York and New England in the progress of manufactures during the last twenty years. Her coal and iron are producing their legitimate results in making her a great manufacturing State.

7. Ohio is the first State in the Union as to the proportion of youth attending school; and the States west of the Alleghenies and north of the Ohio have more youth in school proportionably than New England and New York. The facts on this subject are so extraordinary that I may be excused for giving them a little in detail:

The proportion of youth in Ohio attending school to the population is							.... 1 in 4.2
"	"	"	Illinois	"	"	"	.... 1 in 4.3
"	"	"	Pennsylvania	"	"	"	.... 1 in 4.8
"	"	"	New York	"	"	"	.... 1 in 5.2
"	"	"	Connecticut and Massachusetts			"	.... 1 in 8.7

These proportions show that it is in the West, and not in the East, that education is now advancing; and it is here where we see the stimulus given by the ordinance of 1785 is working out its great and beneficent results. The land grant for education was a great one, but at last its chief effort was in stimulating popular education; for the State of Ohio has taxed itself tens of millions of dollars beyond the utmost value of the land grant to found and maintain a system of public education which the world has not surpassed.

8. We have seen that above and beyond all this material and intellectual development, Ohio has provided a vast benefaction of asylums, hospitals, and infirmaries, and special schools for the support and instruction of the dependent classes. There is not within all her borders a single one of the deaf, dumb, and blind, of the poor, sick, and insane, not an orphan or a vagrant, who is not provided for by the broad and generous liberality of the State and her people—a charity which the classic ages knew nothing of, a beneficence which the splendid hierarchies and aristocracies of Europe can not equal—has been exhibited in the young State whose name was unknown one hundred years ago, whose people, from Europe to the Atlantic, and from the Atlantic to the Ohio, were, like Adam and Eve, cast out—"*the world before them where to choose.*"

Lastly, we see that, although the third in population, and the seventeenth in admission to the Union, Ohio had, in 1870, 6,400 churches, the largest number in any one State, and numbering among them every form of Christian worship. The people, whose fields were rich with grain, whose mines were boundless in wealth, and whose commerce extended through thousands of miles of lakes and rivers, came here, as they came to New England's rock bound coast—

"With freedom to worship God."

The church and the school-house rose beside the green fields, and the morning bells rang forth to cheerful children going to school, and to a Christian people going to the church of God.

Let us now look at the possibilities of Ohio in the future development of the American republican republic. The two most populous parts of Europe, because the most food-producing, are the Netherlands and Italy, or, more precisely, Belgium and ancient Lombardy; to the present time their population is, in round numbers, three hundred to the square mile. The density of population in England proper is nearly the same. We may assume, therefore, that three hundred to the square mile is, in round numbers, the limit of comfortable subsistence under modern civilization. It is true that modern improvements in agricultural machinery and fertilization have greatly increased the capacity of production on a given amount of land with a given amount of labor. It is true, also, that the old countries of Europe do not possess an equal amount of arable land with Ohio in proportion to the same surface. It would seem, therefore, that the density of population in Ohio might exceed that of any part of Europe. On the other hand, it may be said with truth that the American people will not become so dense as in Europe while they have new lands in the West to occupy. This is true; but lands such as those in the valley of the Ohio are now becoming scarce in the West, and we think that with her great capacity for the production of grain on one hand, and of illimitable quantities of coal and iron to manufacture with on the other, that Ohio will at no remote period reach nearly the density of Belgium, which will give her ten million (10,000,000) of people. This seems extravagant, but the tide of migration which flowed so fast to the West is beginning to ebb, while the manufactures of the interior offer greater inducements. With population comes wealth, the material for education, the development of the arts, advance in all the material elements of civilization, and the still grander advancements in the strength and elevation of the human mind, conquering to itself new realms of material and intellectual power, acquiring in the future what we have seen in the past, a wealth of resources unknown and undreampt of when, an hundred years ago, the fathers of the republic declared their independence. I know how easy it is to treat this statement with easy incredulity, but statistics is a certain science; the elements of civilization are now measured, and we know the progress of the human race as we know that of a cultivated plant. We know the resources of the country, its food producing capacity, its art processes, its power of education, and the undefined and illimitable power of the human mind for new inventions and unimagined progress. With this knowledge it is not difficult nor unsafe to say that the future will produce more, and in a far greater ratio, than the past. The pictured scenes of the prophets have already been more than fulfilled, and the visions of beauty and glory which their imagination failed fully to describe will be more than realized in the bloom of that garden which republican America will present to the eyes of astonished mankind. Long before another century shall have passed by, the single State of Ohio will present four-fold the population with which the thirteen States began their independence, more wealth than the entire Union now has, greater universities than any now in the country, and a development of arts and manufactures which the world now knows nothing of. You have seen more than that since the Constitution was adopted, and what right have you to say the future shall not equal the past?

I have aimed in this address to give an exact picture of what Ohio is, not more for the sake of Ohio than as a representation of the products which the American republic has given to the world. A State which began long after the declaration of independence, in the then unknown wilderness of North America, presents to-day the fairest example of

what a republican government with Christian civilization can do. Look upon this picture and upon those of Assyria, of Greece or Rome, or of Europe in her best estate, and say, where is the civilization of the earth which can equal this? If a Roman citizen could say with pride, "*Civis Romanus Sum*," with far greater pride can you say this day, "I am an American citizen."

PART II.

ANTIQUITIES OF OHIO.

REPORT OF THE COMMITTEE OF THE STATE ARCHÆOLOGICAL SOCIETY.

To the Centennial Commissioners of Ohio:

GENTLEMEN—The funds, amounting to $2,500, for an exhibit of the antiquities of Ohio, were entrusted by you to the "State Archæological Society." This Society appointed the undersigned and Judge Sloane, of Ottawa, a special committee, to collect relics of the races prior to our own, forward them to Philadelphia, arrange them for exhibition, and return them to the Society or to their owners. Judge Sloane took an active part in collecting, forwarding, and arranging the collection, but has not been able to assist in this report, or to authorize the use of his name. At least a year was necessary to do this work in a satisfactory manner, but we had little more than two months of available time.

The State Society having been in existence only half a year, and being without money, had very few of these relics in its possession. There are, however, a large number of private collections within the State, probably more complete than those of any other State; but there had been no systematic intercourse among the owners of these cabinets, and there were no published catalogues of their contents. Some of us immediately visited all or nearly all of these collections, with a view to secure donations or loans of articles of archæological value. A blank form was widely distributed, in which those who could not be seen personally were requested to give a list of articles in their possession. Most of those which we were able to forward to Philadelphia are loans, which have been returned. The names of those who have made contributions or loans have appeared in your report.

This occasion has furnished means of comparison between the relics of Ohio and those of other parts of the United States that may not occur again in this generation. A tabulated list of those in the Ohio department will be found in Colonel Whittlesey's report. We also took advantage of this opportunity to get as complete lists as practicable of relics

exhibited from other States, and especially those in possession of the Smithsonian Institution, including the entire territory of the United States.

Although, from want of time, the Ohio collection could not be made complete, it stood next that of the Smithsonian in interest and value. The mound-builders were nowhere more populous than on the Ohio and its tributaries. They were particularly numerous on the Miami, the Scioto, and the Muskingum rivers and their affluents. Their successors, the northern Indians, were as numerous here as anywhere within the United States.

Of course, the relics of both races are plentiful, but it is beyond the ability of individuals to find, examine, and describe them. This is a work which must of necessity be done by the State, or it will never be thoroughly accomplished. Societies and individuals in other States have their agents already at work, making collections in Ohio, and removing them to various institutions outside of this State.

In the early days of the Exhibition, we had hopes that our funds would warrant the publication of a descriptive catalogue, with illustrations, the preparation of which was in part accomplished by Colonel Whittlesey. It was the intention of Professor Read to furnish that part relating to *flint implements* and to *pottery*, but his other engagements nearly frustrated this plan. Colonel Whittlesey has furnished such descriptions as are reasonably complete, which, with the illustrations, are made a part of this report.

The Association put upon exhibition a large Archæological Map of the State, showing the territory occupied by the recent Indian tribes, and the location of the principal earth works attributed to the mound-builders. Much is to be added to this map to perfect it.

It is of the first importance that all these works should be carefully explored, surveyed, and platted, and all the information that can be gathered be systematized and preserved. Private explorers often demolish important works, and preserve no valuable information in regard to them. Mere curiosity-hunters frequently destroy these ancient mementos, thus doing irreparable injury to the work of the scientific archæologist. It is confidently hoped that in some way the Legislature of the State will make provision for this work.

Our State, in the distant past, has been occupied by a dense population of agriculturists, dwelling in fixed communities, bound together by peculiar customs, laws, and religious rites, executing works requiring an immense amount of labor, and exhibiting great engineering skill. It is

certainly proper that we, who have inherited their territory, should do what we can to decipher and preserve the records left us of their history.

The precise location of many articles on exhibition can not now be ascertained. It is, therefore, probable, that some of them were found beyond the limits of Ohio. All of our citizens are requested to send such articles in this line as they may have and are willing to part with for the benefit of the public, to M. Hensel, Secretary, or J. H. Klippart, Custodian, Columbus, to form part of the collections of the State Society. Members of the Legislature will, no doubt, assist in bringing relics to the capital for this purpose.

We have a record, in detail, of all articles that came to us prior to the time fixed for forwarding them to Philadelphia. More were forwarded afterward from various parties, and of these the account could not be so thoroughly made. It was our intention to give each party public credit for every article that formed part of the exhibition, but for the above reasons this has become impracticable.

Respectfully yours,

M. C. READ,
CHARLES WHITTLESEY.

CLEVELAND, *January* 1, 1877.

RELICS AND ROCK SCULPTURE OF OHIO.

Introduction.

These descriptions of relics sent from Ohio to Philadelphia was commenced with the expectation that the committee would have funds to print it for use during the Exposition.

When about half finished, it became apparent that the money in our hands would no more than meet other necessary expenses, and the idea of publication was abandoned. What follows is little more than the matter prepared by myself during the early period of the exhibition.

Prof. Read expected to take up the department of pipes and human effigies, flint implements and weapons, and also that of pottery, but he devoted so much time to the exhibit at Philadelphia that it became impracticable for him to carry out his intentions.

No one will expect, under these circumstances, that this work will be complete in any department. It is given in this comparatively unfinished condition at the request of the trustees of the State Society.

It embraces—

1st. A tabulated list of relics exhibited from this and other States, except those of the Smithsonian museum.

2d. A notice of rock inscriptions in Ohio, so far as the Western Reserve Historical Society have tracings, exhibited at Philadelphia.

3d. A paper on ancient copper implements, including a classified list.

4th. Partial descriptions and illustrations of relics in stone, flint, bone, shell, and of pottery.

5th. A list of the principal ancient earth-works in Ohio, as represented upon the Archæological Map.

To make the subject of rock inscriptions more complete, I introduce some papers heretofore published by myself or the Western Reserve Historical Society. In the Smithsonian contributions for 1849, Mr. E. George Squier published some sketches of rock-engraved effigies along the Ohio River, which attracted the attention of travelers more than a century since.

The investigations hitherto made, show them to be of the style and for the purpose of pictorial writing, such as are made by the red men of America. They are found on rocks, trees, and sheltered banks of clay throughout the United States, none of which are yet proven to be the work of the mound-builders. In none of them are the characters *alphabetical*, but always symbolical or *pictorial*. Investigations hitherto made give little value to these inscriptions as records.

CHAPTER I.

LIST OF RELICS EXHIBITED AT PHILADELPHIA, 1876, NOT INCLUDING THE SMITHSONIAN COLLECTION.

UTENSILS, IMPLEMENTS, AND WEAPONS.	STATE OF OHIO.			From other States.	Aggregate.
	On exhibition at Philadelphia.	In private cabinets as far as known.	Ohio total.		
Stone.	No. of pieces.	No. of pieces.		No. of pieces.	
Grooved axes. The smaller ones were probably used also as battle-axes and coal-scrapers.	189	168	357	251	608
Grooved hammers. Used also as mauls, war-clubs, and possibly as net-sinkers.	25	34	59	106	165
Hand hammers. Small, flat, oval or round, without grooves; probably used as picks, beakers, and chipping tools, and as a slung-shot; generally rough; not polished.	95	31	126	.....	126
Fleshers and scrapers. Long oval, with a sharp bit, for scraping and peeling off hides; bark peelers and coal-scrapers; generally polished.	314	411	725	222	947
Grain crushers and rollers. Pestles with a broad base, and pestles with pointed ends; probably used also as rollers.	84	130	214	17	231
Mortars. Very few discovered; probably most of them were of wood.	.....	.....	.....	.....	.....
Wedges. Like short fleshers or chisels, more often in miniature, and of specular or hematite iron ore; like playthings or ornaments.	28	92	120	31	151
Shuttle-form stones. Thin, flat, polished slate, perforated flatwise; uses conjectural, possibly as thread-twisters and sizers; many of them resemble pendants or other ornaments.	45	24	69	3	72
Circular stones or discs. Round and flat, diameter 2½ to 6 inches, frequently cup-shaped on both sides, with a hole at the center; supposed to have been used in games—perhaps as quoits.	36	22	58	43	101
Pipes. In great variety, size, style, and material, frequently having a carved effigy.	59	47	106	19	125
Polishers. Long, slender stones, fine grain and polished; form various, uses conjectural.	6	2	8	2	10

LIST OF RELICS EXHIBITED AT PHILADELPHIA, 1876.—Continued.

UTENSILS, IMPLEMENTS, AND WEAPONS.	STATE OF OHIO.			From other States.	Aggregate.
	On exhibition at Philadelphia.	In private cabinets as far as known.	Ohio total.		
Wands, Badges, Insignia, and other Ornaments.	No. of pieces.	No. of pieces.		No. of pieces.	
Crescents These are single and double, generally of striped slate, perforated lengthwise at the center, and polished.	27	7	34	.....	34
Tubes Long tubes may have been used as whistles or calls, the shorter ones as beads and pendants.	21	23	45	.....	45
Breastplates or gorgets These are thin, flat slates, oval or crescent in form, and perforated flatwise for suspension.	3	9	12	2	14
Balls and spheres Small perforated and polished balls; were probably worn as ornaments; they are principally of slate and iron ore.	27	68	95	34	129
Pendants These are both flat and round, polished and perforated. The round ends are generally of specular iron-ore, with a groove around the small end.	73	63	136	16	152
Boat-shaped mortars These have been called paint-mullers, but as they are sometimes perforated for suspension or attachment, they more properly come within the definition of ornaments.	10	24	34	3	37
Hemispheres Flat or conoid on the round side; often cup-shaped at the center, and generally made of iron-ore. Not perforated.	17	3	20	4	24
Saddle-shaped birds Nearly all have a hole at each end of the base for attachment to some other object.	9	4	13	5	18
Badges or wands These are tubes of slate, with symmetrical lobes or wings; highly polished and elegant.	30	7	37	11	48
Miniature picks Generally of quartz, with an eye, and seldom more than 2½ or 3 inches long. May be badges, playthings, or ornaments.	.....	3	3	1	4

LIST OF RELICS EXHIBITED AT PHILADELPHIA, 1876—Continued.

UTENSILS, IMPLEMENTS, AND WEAPONS.	STATE OF OHIO.			From other States.	Aggregate.
	On exhibition at Philadelphia.	In private cabinets as far as known.	Ohio total.		
Articles of Bone, Horn, or Shell.	No. of pieces.	No. of pieces.		No. of pieces.	
Bodkins, awls, and needles	.....	13	13	.....	13
Beads—shell	310	.....	310	.....	310
" bone	.....	351	351	.....	351
" teeth of animals	.....	5	5	7	12
Head plates and gorgets of shell	3	.....	3	1	4
Articles of Flint, principally on large cards.					
Arrow points and cutters, about	2,500	.....	.....	.....	.....
Spear heads and daggers, about	350	.....	.....	.....	.....
Knives and cutting implements, about	200	.....	.....	.....	.....
Scrapers and flakes, about	650	.....	.....	.....	.....
Borers and miscellaneous	150	.....	.....	.....	.....
Pottery.					
Kettles, bowls, vases or urns, bottles	16	.....	.....	.....	.....
Copper Implements—Ornaments and Weapons.					
Axes and adzes Chisel form; not perforated; one double bit.	.....	33	33	7	40
Chisels and gauges Less tapering toward the poll than axes.	.....	9	9	18	27
Daggers, lance-heads, and knives These varieties run into each other. Some are like spatula.	.....	7	7	111	118
Bodkins, borers, drills, and awls The distinction among these is principally in their size, varying from 1½ to 16 inches in length.	.....	8	8	34	46
Beads and short cylinders	38	650	688	5	693
Head and breast plates	1	9	10	9	19
Spades and bark peelers	.....	.....	.....	7	7
Bracelets and pendants	.....	31	31	.....	31
Buttons or spools	.....	4	4	2	6
Miscellaneous plates and nuggets	.....	26	.....	.....	26

CHAPTER II.

Ancient Rock Sculptures.

In many places within the State rude effigies of man and animals have been observed, chiseled or picked into the natural surface of the rocks. They are most numerous in the eastern half of the State, where the grits of the coal series furnish large blocks or perpendicular faces of sandrock, which are easily cut, and which are, at the same time, imperishable. These surfaces are never prepared for inscriptions by artificial smoothing. The figures are sunk into the stone by some sharp-pointed tool like a pick, which has left the impression of its point similar to the rough hewn stone of our masonry. This tool has not been found in the form of a pick, and was probably only a small angular stone, held in the hand and used as a chipper until the points and angles were worn off. Many artificial stones of flint, trap, and greenstone are seen in all large collections, from two to four inches in diameter, evidently worn into a partially rounded form by blows that have chipped off the projecting corners. Some are quite thoroughly rounded and even polished like the spherical balls. Such balls, sometimes called "sling-stones" or "slung-shots," could, in their rough condition, have answered the purpose of a picking tool, at the same time being itself brought into shape for a weapon or an ornament. Such contrivances, to save labor by accomplishing two purposes at once, are visible in other fabrications of the early races. Rude picks of the early races in Europe have been found, which were made by inserting a pointed stone in the prong of a deer's horn. Such an implement seems to be required to finish some of the channeling observed on some of our rocks, and may yet be found. How ancient the intaglios are can not yet be determined, but there is one instance at Independence, Cuyahoga county, where soil had accumulated over them to a depth of one to one and a half feet, on which were growing trees of the usual size in that region. The Western Reserve Historical Society has procured several tracings of them on muslin, of the size of nature, which were found, for exhibition.

It has been found that sketches, even by good artists, are so deficient in accuracy as to be of little value. By clearing out the channels sunk in the rock, painting them heavily, and pressing a sheet of muslin into the freshly painted depressions, an exact outline is obtained. This is photographed to the size intended for engraving, and thus the reduced copy remains an accurate *fac simile* of the original. Those which are mentioned below were traced and reduced in this manner.

TRACK ROCKS NEAR BARNESVILLE, BELMONT COUNTY, OHIO.

In 1857 or 1858, Mr. Thomas Kite, of Cincinnati, examined the "track rocks" near Barnesville, and took casts of some of the sculptured figures. Jas. W. Ward, Esq., of the same city, soon afterward made a detailed sketch, which he caused to be engraved and circulated. In 1869 Dr. J. Salisbury and myself made a visit to the place with a view to get a tracing on cloth, but were compelled to give it up for want of time. An arrangement was made with Dr. Jas. W. Walton, of Barnesville, to take tracing for this Society, which, however, was not received until the fall of 1871. The discussion which took place at the Indianapolis meeting of the American Association, in August, 1871, was based upon Mr. Ward's sketch, which had been made with much care, he being not only an artist but an antiquarian.

This was reproduced, with a detailed description, by Mr. Ward, in the first number of the American Anthropological Journal, issued in January, 1872, at New York. When Dr. Walton's *fac simile* tracings, size of nature, were received, it was evident that notwithstanding the care exercised by Mr. Ward, there were important omissions, which destroyed the value of the discussions at Indianapolis, based upon his sketch. It is now conceded that copies of such sculptures must be made by casts, squeezes, or tracings, in order to be reliable. In the different representations that have appeared of the "Dighton Rock," the supposed Grave Creek stone, the "Big Indian Rock," on the Susquehanna, and the "Independence Stone," of this county, something material is omitted, or palpably distorted. Mere sketches are of little or no ethnological value. I think the mode adopted by us leaves little room for errors, either in size or proportion, but there may be in the manner or aspect that belongs to every object, and which is known by the plain but forcible expression, "life-like." The rock was first thoroughly cleaned of the moss and dirt, as Dr. Walton explains in his letter accompanying the tracings. All of the artificial depressions were then filled with paint, and a sheet of muslin, covering the entire block, pressed into the sculptured figures. This coarse grit is so nearly imperishable that whatever distinct markings were originally cut upon it are doubtless there now and are not perceptibly injured by exposure. These groups present the first instance among the rock inscriptions of Ohio, where it can be said that we now have complete and entire, in their primitive condition, all the figures that are capable of being traced, not mutilated, by man, or obliterated by the elements. Dr. Walton's description will now be both intelligible and interesting:

"The copies I send you exhibit every definite figure those rocks contain, and indeed many more than will be noticed by a casual observer of them.

"Some of them were discovered only after removing the lichens of ages; others after glancing the eye along the surface of the rocks from every point of the compass; and others after the sun had declined low in the west, casting dim shadows over depressions too shallow to be seen before. And there are many indistinct impressions on each of the rocks that could not be copied—these resemble the indefinite remains of innumerable tracks of men and animals, overlying each other, as may be seen on our highways, after a rain has effaced almost every outline.

"Upon examining the point of the smaller rock it will appear that two men, each accompanied by a dog, seem to have passed over it in opposite directions. This idea has never, so far as I have learned, occurred to any person who has heretofore examined the rocks; the figures being regarded as distinct and disconnected, as they appear on the larger stone. I did not catch the idea until after I had painted all the distinct figures on this stone, and had impressed the cloth on the paint, when, upon removing and examining the print, I found, say, first a right foot print, then a left one at its appropriate position, then a right foot where it should be, but the succeeding left one wanting.

"This set me on a more careful examination of the motley indentations covering this part of the rock for traces of the lost feet, and it was not a great while before I found sufficient remains of just what was wanting, and at their appropriate places, but in exceedingly indistinct impressions.

"The rude cuts of human faces, part of the human feet, the rings, stars, serpents, and some others, are evidently works of art, as in the best of them the marks of the engraving instrument are to be seen; and it is barely possible that the residue of those figures were carved by the hands of men; however, I must say that the works of the best sculptors do not surpass the exquisite finish of most of the tracks on those rocks."

PLATE I.—BARNESVILLE TRACK ROCKS NO. 1—1-20TH OF NATURE.

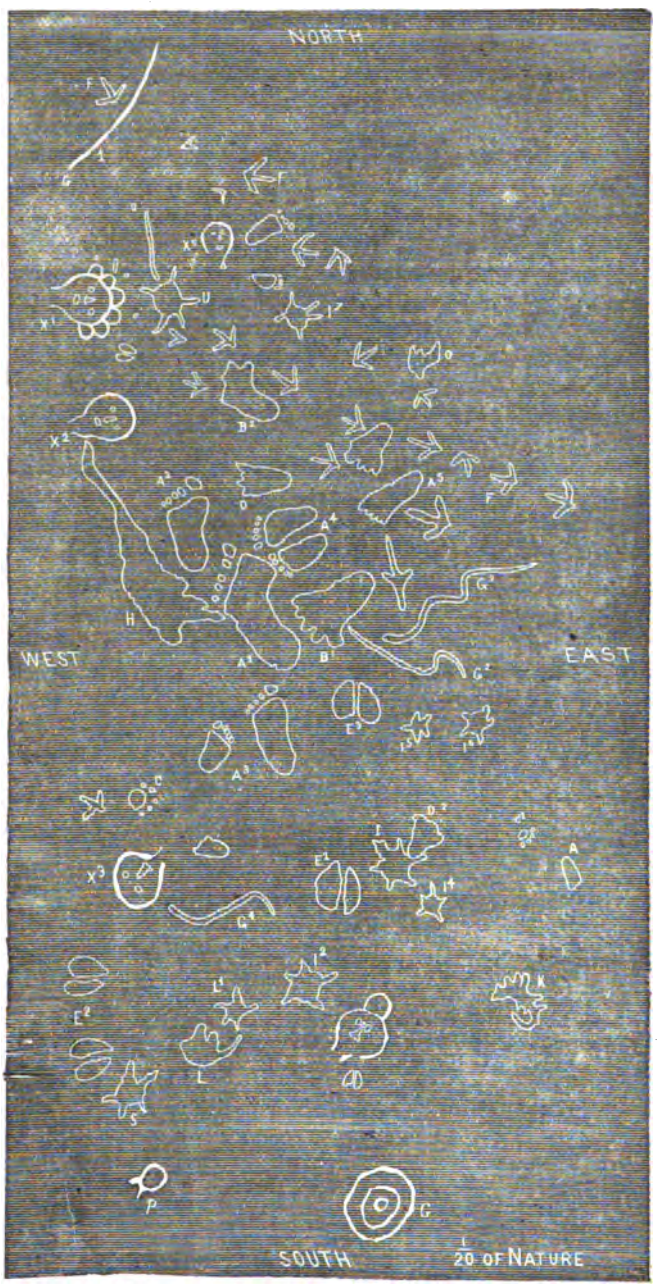
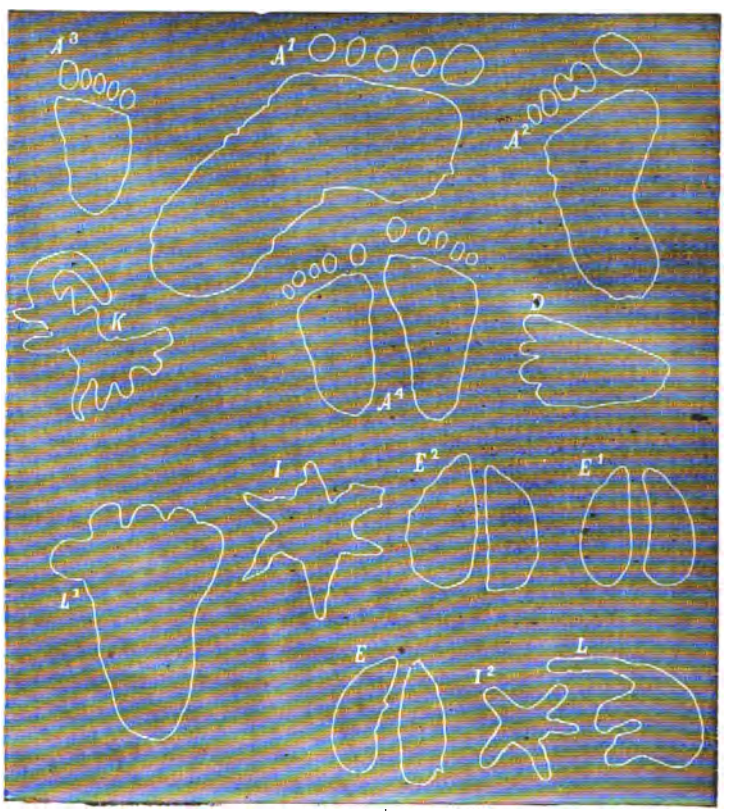


PLATE II.—ENLARGED FIGURES OF NO. 1—1-7TH OF NATURE.



BLOCK NO. 1—1-20TH OF NATURE.

In all cases, whether single or in groups, the relative dimensions of the figures are preserved. The surface of this block is eight by eleven feet. An error has crept into the engraving of this group, in regard to the east and west sides, which should be reversed: for east read west, and for west east.

*a*1—human foot, greatest length 15 inches.
*a*2—human foot, greatest length 10 inches.
*a*3—human foot, greatest length 3½ inches.
b—Nos. 1 and 2, apparently the fore foot of a bear, 5½ to 9 inches long.
c—hind foot of a wolf or dog, breadth across the toes 3½ inches.
*c*1—hind foot of a wolf or dog, breadth across the toes 2½ inches.
d—probably the hind foot of a bear, length 5½ inches.
e—Nos. 1 to 5, buffalo tracks, length 2 to 5 inches.
f—Nos. 1 to 13, so called "bird tracks," 3½ to 5 inches in length.
g—Nos. 1 to 4, snakes, or portions of them, 13 to 21 inches in length.
h—effigy of a bird, greatest length 22 inches.
i—Nos. 1 to 9 resembles the spread out skin of an animal, 3 to 8 inches greatest diameter.
k—not recognized as an animal form, length 6 inches.

l—an imperfect figure.

n—probably a variation of *i*, with a groove that may have been part of the figure.

o—apparently incomplete.

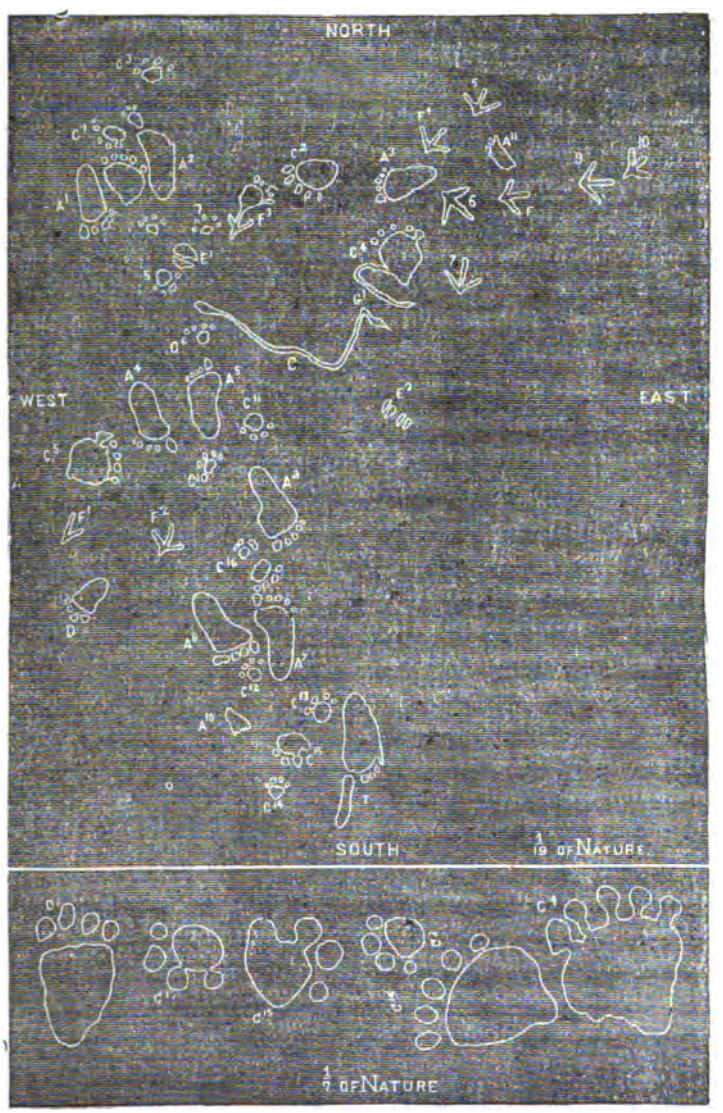
p—greatest length 6 inches.

q—spirit circle, diameter 7½ inches.

s—Nos. 1 to 3, outlines of the human face, breadth 3½ to 6 inches.

There is a rock in Georgia, described by the antiquarian, C. C. Jones, of that State, on which are a number of circles like "g," a sign used by the Chippeways to represent a spirit.

PLATE III.—BARNESVILLE TRACK ROCK NO. 2—1-19 AND 1-7 OF NATURE.



BLOCK NO. 2, 7 FEET BY 8, LYING 20 FEET SOUTH OF NO. 1.

a—Nos. 2, 6, 7, and 8, human foot 9 inches long.
a[10] " " 3½ " "
c—Nos. 1 and 10 to 16, hind foot of a dog or wolf, 2½ to 4 inches broad across the toes.
c—Nos. 2, 3, 4, and 5, five toes, greatest breadth 4 to 5½ inches across the toes (the animal not recognized).
d—hind foot of a bear.
e[1]—buffalo track, 3 inches long.
e[2] " " 1½ " " a pair.
f—so called "bird tracks," 3½ to 5 inches long.
g—snake, 21 inches long. *g*[1]—part of same.
t—groove, 5 inches long.

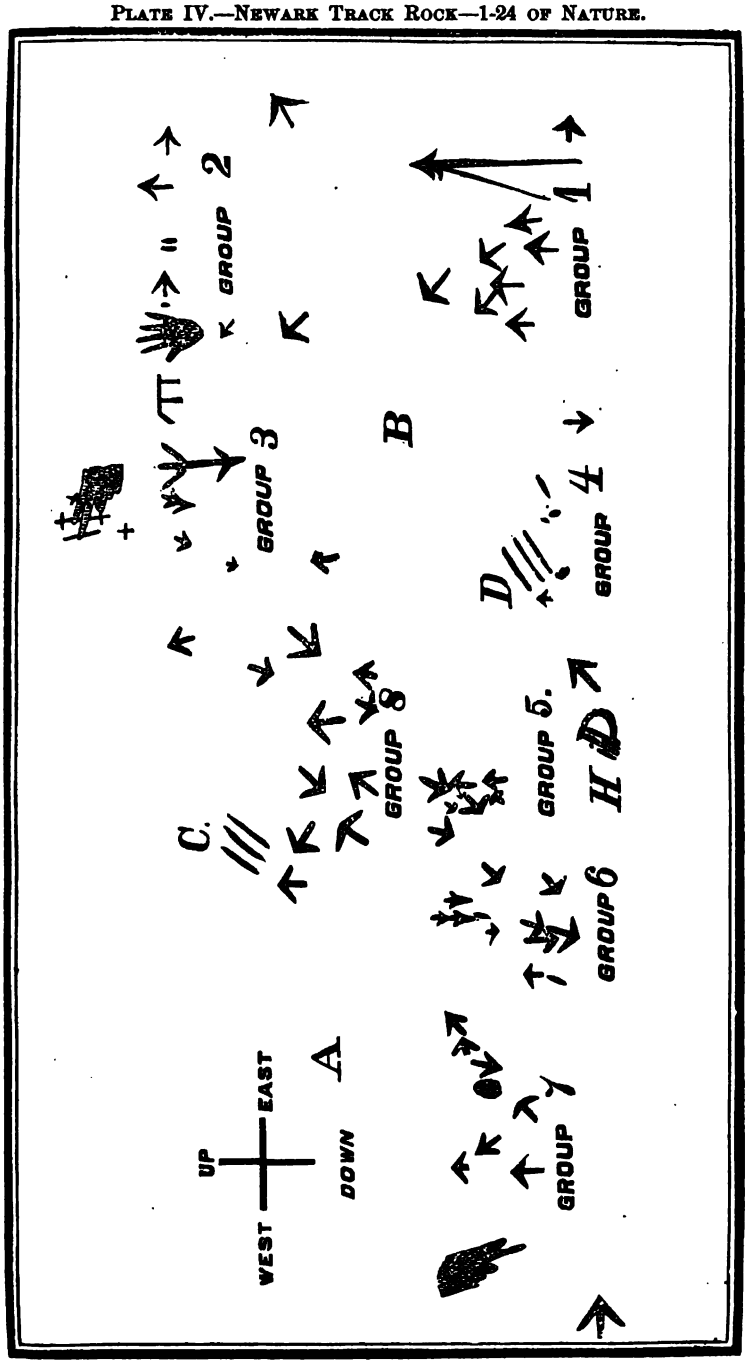
We have here as good representations as it is possible to procure of an entire rock inscription. The copy of the Independence stone embraces only a fragment of the original, not exceeding one-fourth of the surface; once covered with sculptured effigies. If the figures had a general relation to each other, it could not be determined by an inspection of only a portion of them.

The inscriptions near Newark, in Licking county, Ohio, originally covered a vertical face of conglomerate rock, fifty or sixty feet in length, by six and eight feet in height. This rock is soft, and, therefore, the figures are easily erased. As the place was partially sheltered from the weather by overhangs, the injury done to them by exposure was not much; but from the earliest settlement of the country, about the year 1800, it became a place where white men sought to immortalize themselves by cutting their names across the old inscriptions. When Dr. Salisbury, in 1864, undertook to rescue what remained of them, it was only possible to trace the ancient figures over a space about seven feet by thirteen, and here many of them were restored with difficulty, by great patience and labor. His copy is in the hands of the American Antiquarian Society, and is in the course of publication. It is, therefore, like the Independence stone, only a fragment.

On the rock faces and detached sandstone blocks of the banks of the Ohio River, there are numerous groups of intaglios, but in them the style is quite different from those to which I have referred, and which are located in the interior. Those on the Ohio River resemble the symbolical records of the North American Indians, such as the Kelley Island stone, described in Schoolcraft by Captain Eastman, the Dighton Rock, the Big Indian Rock of the Susquehanna, and the "God Rock" of the Alleghany River. In those the supposed bird track is generally wanting. The large sculptured rock, near Wellsville, which is only visible at low water of the Ohio, has among the figures one that is prominent on the

Barnesville stones. This is the fore foot of the bear, with the outside toe distorted and set outward at right angles.

PLATE IV.—NEWARK TRACK ROCK—1-24 OF NATURE.



A, B—portions of the cliff without effigies.

C, D—parallel grooves common on rock sculptures.

1, 2. 3, etc., designate the several groups of tracks and effigies.

All wrought with a pick, the marks of which were visible. The rock reputed to be now destroyed in quarrying stone.

SCULPTURED CLIFF NEAR NEWARK, OHIO.

This illustration is a *fac simile* of the tracing on muslin by Dr. and Mrs. J. H. Salisbury, in 1859. It is on a scale 1-24th of nature, reduced to the present size by T. T. Sweeny, an experienced photographer. At A and B there were no visible sculpturing. The rock is not hard, and shows signs of decomposition. When Licking county was first visited by white settlers, about the year 1810, they frequently cut their names on this cliff, regardless of the inscriptions of their predecessors. Many of these names, which were intended to be immortal, are already obliterated. Probably the vacant spaces were filled with characters in more ancient times. The straight grooves at C and D are common in other rock inscriptions. Those at H, at *a* of group No. 7, and at *c* of group No. 1, are rare in Ohio. Under this cliff is a deep deposit of kitchen refuse, not yet explored, like that in the Elyria Shelter Cave and other rock shelters. Dr. Salisbury has classified the characters and worked up his observations fully for the American Antiquarian Society. Only a brief abstract of his work is given below, by permission:

The ancient bird-track and other characters upon this cliff were first discovered by my brother, C. B. Salisbury, in 1858, while he was engaged in working up the details of the ancient works in central Ohio.

Since this discovery other sculptured rocks of a similar character have been found in Fairfield, Belmont, Cuyahoga, and Lorain counties.

That the ancient bird-track character belonged to the mound-builders, is evident from the fact that it is found among their works, constructed of soil, on a large scale.

One of these bird-track mounds occurs in the center of the large circular inclosure near Newark, Ohio, now standing in the Licking county fair grounds.

This cliff is situated on the road from Newark to Natchez, about six (6) miles from the former place, and about half a mile from Clay Lick station. It stands on the north side of the road, about seventy feet from it, and one hundred feet north of the canal. The cliff rises about forty feet high, and projects itself so as to protect its face from rains.

At the base of the cliff, and immediately under the inscription, is a large heap of kitchen refuse, from three to four feet deep, filled with ashes, charcoal, arrow-heads, fragments of stone axes, shells, and bones of animals, the long ones split longitudinally for the marrow.

Numerous fragments of pottery, some thin and some very thick and coarse, are met with. In this inscription occur between seventy and eighty characters, the most of which are of the bird-track type. A drawing of these characters, natural size, is herewith presented to the Society. This drawing was made by fastening paper-muslin on the face of the cliff, and then with a soft pencil the workings were traced.

In this way the sculptured figures were transferred to the muslin, as they occur on the cliff.

A careful drawing of the inscriptions, much reduced, also accompanies this brief description. Among the characters will be noticed the human hand.

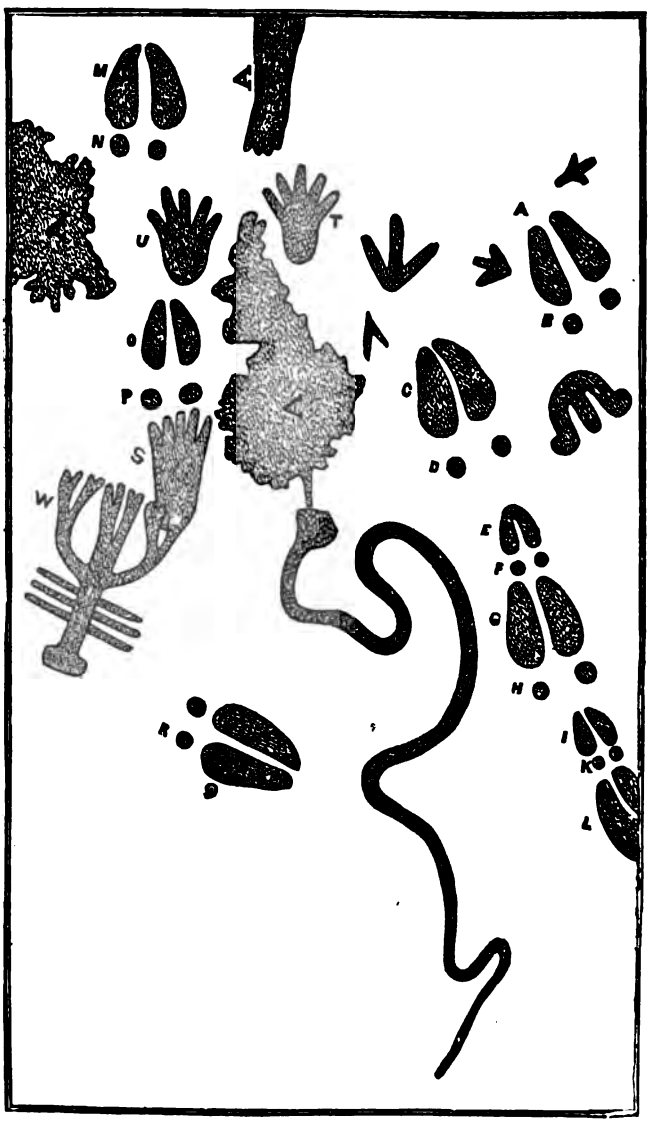
In one instance the hand is open, the palm facing the observer; and in the other the hand is closed, except the index finger, which points downward to the base of the cliff.

Of the bird-track characters there are many varieties, as will be seen by referring to the plate accompanying this [not engraved], where the different characters are classified. There is also a character resembling a cross, and another bearing some resemblance to an arrow. About two thousand three hundred years before Christ, the Chinese invented and used what was called the "bird-track" character. They also soon after devised and used the mode of reading ("Quippos") found among the Incas in Peru at the time of its conquest by the Spaniard.

This cliff, with other inscribed rocks in Ohio, were minutely described in a paper which I furnished the American Antiquarian Society in 1863, and which is now in their hands for publication. The duplicate drawings, with this brief description, I herewith present to the Western Reserve Historical Society for safe keeping, and for any use the Society may see fit to appropriate it to.

J. H. SALISBURY.

PLATE V.—INDEPENDENCE SLAB, 4¼ BY 6 FEET, NOW IN THE WEST WALL OF THE CHURCH—1-14TH OF NATURE.



A A A—Irregular patches slightly worked with a pick.

THE INDEPENDENCE STONE.

Great care has been taken to obtain a correct sketch of what remains of this inscription. A very rude drawing of it was published in Schoolcraft's great work upon the Indian tribes, in 1854. He probably regarded

it as the work of the red man. In 1869, Dr. J. H. Salisbury, who has long been engaged in the investigation of rock inscriptions at the West, in company with Dr. Lewis, of the Asylum at Newburgh, made a copy, by means of full and exact measurements.

As no sketch is of equal authenticity with a photograph, Mr. Thos. T. Sweeney, an artist at Cleveland, went to Independence, and took a copy with his instrument. The light on that day was not favorable, but the outlines of all the artificial work upon the stone were thus secured with exactness. For the purposes of the engraver, the figures were filled in by Dr. Salisbury from his sketch. Without expressing an opinion as to the authors of these inscriptions, I present, in connection with the engraving, the details furnished by Dr. Salisbury:

Mr. W. F. Bushnell, who resides at Independence, and M. B. Wood, of Cleveland, state that these markings were discovered about 1853, while stripping the earth from the surface of a quarry on the north brow of the hill on which the village of Independence stands. Here the rocks projected in the form of a perpendicular cliff, from twenty to forty feet in height. On the top of this cliff, and near its edge, the markings were discovered. The soil over the markings was from five to eight inches in depth, and was black, having been formed from decaying vegetation. A tree was growing directly over the markings, that was one foot or more in diameter. Within a few feet of the spot there was an oak tree over four feet in diameter. This tree, some years previous to the discovery of the sculptured rock, had fallen nearly across the markings, and, in 1853, was much decayed. Besides the markings represented in the engraving, there were others adjacent, belonging to the same group, which had been destroyed by the quarrymen before Messrs. Bushnell and Wood were aware of it. Among the markings destroyed, were the outline figures of a man and woman, very well executed. There were also the representations of a wolf's foot, and figures of the feet of other animals.

At the time of the discovery the stone church at Independence was being built, and, at the suggestion of Deacon Bushnell and others, all the markings not previously destroyed were carefully cut out, and the block placed in the rear wall of the church, about eight feet above the ground. It was prudently placed at this height to prevent its being defaced, for they are not very distinct.

In company with Dr. Lewis, Superintendent of the Northern Ohio Lunatic Asylum, I visited the locality on the 5th day of June, 1869, and made careful drawings of all the markings visible on the block in the rear wall of the church. These, with accurate measurements, are represented here, made more perfect by the use of Mr. Sweeney's photography.

The rock here described only contains a portion of the inscription; the balance was destroyed in quarrying. The markings on the portion of the rock preserved consist of the human foot, clothed with something like a moccasin or stocking; of the naked foot; of the open hand; of round markings, one in front of the great toe of each representation of the clothed foot; the figure of a serpent; and a peculiar character w, which might be taken for rude representation of a crab or crawfish, but which bears a closer resemblance to an old-fashioned spear head, used in capturing fish.

The clothed feet are of five different sizes. There are eighteen impressions of this kind, arranged in nine pairs. Of the largest size there five pairs—*a*, *c*, *g*, *l*, *m*; of the

next size smaller there is only one pair—*o*; of the next smaller size one pair—*g*; of the next smaller size one pair—*e*; of the next smaller size one pair. Of the naked foot there is only a single figure, which is rudely carved, and which is much longer than the clothed representations. There are two figures of the open hand—one with a large palm and short fingers, the other smaller, with fingers long and slender.

The sculptures have all been made with a sharp-pointed instrument, by the process of pecking, and sunk in throughout instead of being mere outlines. The cuttings are from one eighth to half an inch deep. The two hands are sculptured the deepest. In the illustrations I have endeavored to give an idea of the markings left by the tool used, though these are less evident than the representations.

The length of the largest feet in figures *a*, *c*, *g*, *l*, *m*, from the extremity of the great toe to the heel, is six and three-fourths inches, and the width, at the widest place, two and three-fourths inches. The length of the next in size, *o*, is five inches, and the width two and one-eighth inches; and of *g*, five inches by two inches. Length of next smaller size, *e*, three and a half inches, and width one and three-fourths inches, and three and three-fourth inches by one and a half inches. The length of the naked foot, *s*, is nine inches, and greatest width, four and three-fourths inches. The great toe is one inch long, the second toe one and one-fourth inches long, the third toe one and a half inches long, the fourth toe one and a fourth inches long, and the little toe one inch long.

In the large hand, *t*, the palm is five and a half inches long and three and a half inches wide. The length of the thumb is one and a half inches, the index finger one and three-fourths inches, the middle finger two inches, the ring finger one and three-fourths inches, and the little finger one and a half inches. In the other hand, *u*, the palm is three and a half inches long and two and a half inches wide. The length of the thumb is two and one-fourth inches, the index finger two and a half inches, the middle finger two and three-fourths inches, the ring finger two and a fourth inches, and the little finger two inches.

The diameter of the circular markings, invariably found in front of the clothed feet, are as follows: *b*, one and one-eighth inches; *d*, one and three-fourths inches; *f*, three-fourths inch; *h*, one inch; *k*, half inch; *n*, one and a half inches; *p*, one and one-fourth inches; *q*, one inch.

The diameter of the serpent's head is two and three-fourths inches; length of body, ninety-four inches, making the entire length of the figure about eight feet.

In the sculptured figure, *w*, the measurements are omitted.

It is evident this slab does not contain the entire description. The tracks, *l*, are only partially present, while it is very probable that more tracks occurred in the direction *a*, *b*, arranged in a line as those are from *c* to *l*, where there are ten tracks and eight round characters, and which are probably not all that were originally in this line previous to the stones being quarried. The round markings in front of the clothed tracks may have been intended to represent the tracks of dogs or wolves, but at present they are so smoothed by time that it is impossible to make out any thing but simple irregular circular depressions.

The rock on which the inscription occurs is the grindstone grit of the Ohio Reports, an extensive stratum in northern Ohio, about one hundred and fifty feet below the conglomerate. It is almost pure silex, and possesses the property of resisting atmospheric changes to a remarkable degree. Boulders and projecting portions of the formation, from which this block was obtained, that have been exposed to the weather for ages, preserve perfectly their sharp, angular projections. As a building stone it is superior on

account of its extreme durability. This durability of the rock, and the fact that these markings were covered with earth, explains why they have been so finely preserved.

The markings *a*, *c*, *e*, *g*, *l*, *m*, *o*, and *q*, have been supposed by some to represent the tracks of the buffalo. After carefully measuring them, however, I have come to the conclusion that they were designed to represent tracks of the clothed human foot, and as such have described them.

The so-called bird tracks, which are few and faint on this slab, are numerous and bold on most of the rock inscriptions of Ohio.

INSCRIPTIONS, AND NON-DESCRIPT GROOVES, AMHERST, LORAIN COUNTY, OHIO.

In October, 1873, Dr. E. Sterling and myself visited the locality of some very singular markings upon the rocks on the farm of Mr. J. J. Rice, who resides on lot 95, about two miles south of the railway station. The surface rock is of the Berea or "grindstone" grit. The exposures here are in the form of low, flat domes, on which at the center there is no soil: the bare places embracing one or two square rods of surface each. On all sides the rock passes under a thin, stony soil, on which there was a growth of native chestnut and oak trees, of good size. Some of them have been cut, and among the stumps, grass and bushes cover the ground. Along a low ridge, nearly flat, which is in direction nearly north and south, rising very little above the surrounding land, there are, in a distance of sixty rods, half a dozen bare spots, on which there are great numbers of grooves, most of which have the appearance of artificial work.

Mr. Rice has occupied the land about forty years; but did not notice these figures until fifteen years since. At that time there were, so-called, "turkey tracks" on similar rocks, a mile and a half to the east, which are now broken up. Mr. Rice is an intelligent man and has carefully preserved those on his premises. He and his partner, Mr. Beckwith, entered zealously into our designs, and assisted us by clearing the rocks of soil at several places, in a way that greatly facilitated our work.

On one of the bare spots there are forty-five small artificial cavities, from one inch to four inches in diameter, within a space of fifteen feet square. They are made with a pick, not formed true and smooth by a revolving tool, like the cup-shaded ones of the "spindle stones." Their depth is quite uniform, being a little less radius, and are, therefore, not perfect hemispheres. All the "spindle-stone" depressions are of equal size, having a diameter of an inch and one-half, with a depth equal to radius. These are of various sizes.

No circular cavities were seen except in this group, and among them were no other figures. When this rock was uncovered a few feet distant, there was found beneath the soil, and beneath the roots and stumps of old trees, elaborate channels on the surface, to which I have referred. Some of

them are straight, sharply-cut grooves, fully as deep as they are broad, and from half an inch to an inch wide. Others are curved, having a rounded bottom in the cross section. In many of them are very faint lines, something like artificial markings, parallel to their length. No marks of the pick are visible in them. They cross each other at all angles, forming a concatenation of straight and curved lines. After tracing a portion of them on cloth, we found it difficult to convince ourselves that they were artificial. One copy reduced by photograph will enable every one to judge for himself. [*See plate VI.*] They were found at almost every place where the soil was removed from the rock, but scarcely ever on parts naturally bare. Their general aspect does not represent the forms of the roots of trees. They do not radiate from centers, nor show any regularity of form. No roots have as yet been found in them. In no other place yet brought to our notice, have growing trees absorbed the rock on which they stand to such an extent. On Kelley's Island the soil is quite as thin as it is here, and rests on lime rock.

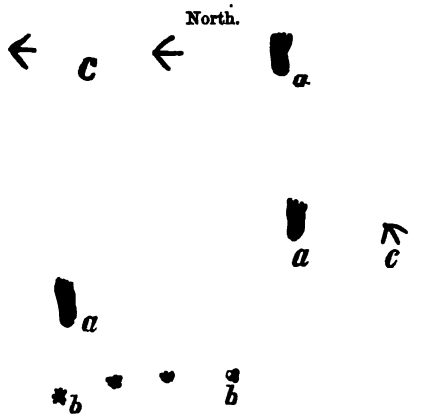
Hundred of acres have there been planed, grooved and polished, by ancient glacial action. The roots of most of the old forest trees penetrated through the soil a depth of one and two feet, to the rock. In only a few instances has the rock been noticeably absorbed or worn away by them. Most of the glaciation is fresh, and the light ice lines or "scratches" are seldom obscured. If a comparatively soft limestone resists the grinding and absorbing action of a network of roots, from the era of the glaciers, to this time, a rock which is nearly pure silex, and has become famous throughout the northern cities for its durability in buildings, should resist it altogether.

On this rock the finest cut architectural ornaments retain their edges perfectly after an exposure of more than a quarter of a century. Silicious matter is absorbed by growing vegetation much less rapidly than calcareous matter. Whatever mechanical action there may be on rocky surfaces, by rubbing, and grinding of the roots of trees, swayed by the winds, should be greater on lime rock than upon sandstone. It is incomprehensible how deep, sharp, narrow channels could be worn into such rock in this manner. Yet I think any one who may examine those at Amherst, will be equally puzzled in regard to their artificial character.

PLATE No. VI.—SCALE 1-6 LINEAR.

This is a fair sample of a dozen groups of figures extending along a space of nearly a quarter of a mile. Most of them are covered with earth and large stumps or trees. We saw among them no sculptured human heads or hands.

FIGURE I.—1-24 OF NATURE—TRACK ROCK, AMHERST, 6 FEET BY 4.



a, *a*, *a*—human feet partially obliterated, length 6 to 7½ inches.
b, *b*—feet of a dog or wolf.
c, *c*—feet of birds.

The feet (Fig. 1) are in regular marching order, but some are wanting. If they had been there originally, the rock is so nearly imperishable, they would be there yet. Among the Arabs, according to Professor Palmer, travelers make an imprint of the foot in the sand with the toes pointing in the direction they are traveling for the information of those who follow. On the blankets and lodges of the Sioux, a red hand indicates that an enemy has been killed; a black hand, that one has been captured. The hands, feet, and other effigies chiseled upon our rocks, no doubt had a meaning well understood among the people by whom they were made.

Twenty rods north of the circular cavities above referred to, are effigies of human feet, and of bird tracks, evidently artificial All of the feet are deficient one toe, which must have been omitted by design. About twelve feet northwest of the center of the group of feet, is a congerie of the mysterious figures to which I have referred, and which are represented in the engraving (Fig. 7).

SKETCHES FROM THE ROCKS, NEAR WELLSVILLE, OHIO.

On the Ohio side of the river, one mile above Wellsville, there is a large group of sculptures on a flat sand rock of the coal series, scarred by floating ice and flood wood. These figures are only visible in low water, as they are only two or three feet above the extreme low stage of the river. Only a few and hasty sketches were taken, under the rays of a broiling sun, in September, 1869. The only use I propose to make of them now is by way of comparison with other rock effigies, described here and elsewhere. In one respect they differ from all others which I have examined.

They are made in double outline, and not by a single, deep channel. The outlines are a series of dots made with a round pointed instrument, seldom more than half an inch deep.

Fig. 2 embraces a rattle-snake (*a a*), with a fancy head and tail. Its length is 4½ feet, a very clumsy affair, but intended for the common yellow rattle-snake of the West. What is meant by the dart-like termination of the tail, the cross-bars, and the fancy head, I do not profess to comprehend. On the bars are thickly cut dots, the impressions of the pick. The head (*a*), which occupies a space six inches square, is represented in Fig. 3, reduced from a tracing size of nature. It brings to mind the horned snake of the Egyptians, which was an object of worship by them.

Fig. 2.

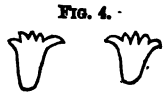
Fig. 2*b* may be an uncouth representation of a demon or evil spirit. *c* is probably an otter carrying a vine or string in his mouth.

This, with his odd markings, had no doubt a meaning for the red man. These three, *a*, *b*, and *c*, are probably related to each other.

Ten rods up stream are large numbers of animal effiges represented in the same way: a turkey, turtles, a fox, a crane, and a rude man and woman standing side by side. Also the two feet, Fig. 4, thirteen inches long. This style of foot, with a long-pointed big toe, out of all proportion to the others, is common among the inscriptions of the Ohio Valley. It may be intended for a bear or a human.

Fig. 3.

Fig. 4.



About three rods above Fig. 2*c*, is another otter, with a better head, the eyes turned somewhat like that in the Bad River effigies, with its tail quite natural. Near this is another foot, which may be that of a bear or a man. About thirty feet above this otter, is a man sitting; his legs very short and deformed; holding something upright in his right hand. A short distance farther up the river is the non-descript creature, Fig. 5, and near it the rude bird, Fig. 3*e*. Its length is two feet, the outline being very distinct. A correct impression of this entire group can only be obtained by a general tracing of the whole, life size. They are all cut by a tool of the same kind in the same style, and may be no more ancient than the early white explorers.

Fig. 5.

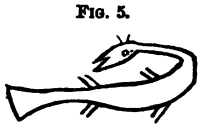


FIG. 6.

Fig. 6 is a reduced copy of Mr. Ward's drawing of the human foot, *a*—No. 1 of the Barnesville, Ohio, track rocks. It is fifteen inches in length, well sunk in the rock, and shows the usual protuberance of the toe joint. The impression of the bare human foot on a soft surface, like clay or mud, at a moderate depth, leaves an outline closely resembling this.

On the flat surface of the Limestone Bluff, opposite St. Louis, on the Illinois shore, overlooking the valley, a pair of human feet have been carved, which are represented in Fig. 7, from a sketch taken by Schoolcraft in 1819. The slab was procured by the late Dr. D. D. Owen, in whose collection I saw it in 1848. It is now at Bloomington University, Indiana. They are 10¼ inches long, and 4 inches broad across the toes. The big-toe joint is not as prominent as usual, and the depth of the sculpture not as great. All marks of the tool are obliterated, which, in limestone, might occur in half a century.

FIG. 7.

There are several instances like that on the Amherst rock, where only four toes are represented. Many persons regard the protuberances of the joint of the great toe, as a marked error in the anatomy of the foot. Dr. Sterling, by the expenditure of five cents, induced a young boot-black to apply his brush to the bottom of his own foot, and to make an impression of it, on a sheet of post-office paper. Figure 8, reduced two-thirds linear, represents this imprint, and shows that on a flat surface a large protuberance is correct. The two others are from tracings of the Barnesville rocks, on a scale of one-seventh of nature.

FIG. 8.
Foot of boy, 1-3d linear.

FIG. 9.
Sculptured foot, 1-7th linear.

FIG. 10.
Sculptured foot' 1-7th linear.

CHAPTER III.

Ancient Copper Implements in Ohio.

After examining a large part of the collection of relics within this State, I was surprised to find so few implements and ornaments of copper. I then prepared a circular, with the names of all articles known to have been fabricated by the people who occupied this region prior to the white race, and sent copies to all the collectors whose address was known to me. Opposite the name of each article, whether of copper, flint, or stone, are blank spaces in the circular, which those who received them were requested to fill with the specimens in their possession. Most of the Ohio collectors responded promptly.

Besides these returns, I have consulted such books and reports relating to Ohio archæology as are accessible to me, and have examined the State and Smithsonian collections at the Centennial Exposition.

From all these sources I hope to make a list or abstract of relics of the pre-historic races, including all forms and materials throughout the United States. The one I now offer includes only those of copper, and embraces this State alone. No State is richer in relics of stone and flint than Ohio.

Possibly when thoroughly investigated, no State will show a greater number of those in copper, but at present the State of Wisconsin takes the lead. Mr. F. S. Perkins, of Racine, has devoted five years to the collection of relics in that State, and has procured one hundred and sixty-four specimens of copper tools, weapons, and ornaments. They are principally from six counties in the southeastern corner of the State, bordering on Lake Michigan. In Ohio, I have as yet heard of only fifty-seven implements, and, beads excepted, two hundred and twenty ornaments, but this number is probably not more than one-half of those which have been already found. Only a small portion of them find their way into collections here; many are never heralded or known beyond the neighborhood, and are lost or sold.

Very few of our mounds have been thoroughly opened. In many cases where they have been explored, articles remain in them not discovered. They are not always to be found with the buried skeletons, but are scattered promiscuously through the mass, and unless great care is used in handling the earth, small articles escape observation. Considering how extensive the copper mines of the mound-builders were on Lake Superior, they must have been well supplied with implements made of that metal, which was the only metal they had.

The ancient population which used it must have numbered half a million, with a probability of a million. They mined many hundred tons

of copper, which was made into small articles, generally less than a half a pound weight, seldom weighing more than three pounds. There must have been several millions of those tools and decorations in use during the period of their occupation, which exceeded one thousand, and probably reached three thousand years. Their stone relics are numerous, and are well preserved, while those of copper have nearly disappeared. What has become of them?

To account for their present scarcity, we must consider that such as were left on the surface would soon disappear by decomposition, to which copper is nearly as liable as iron. Only a small portion of the deceased mound-builders were placed in burial mounds, and of these only a part were buried with their implements and ornaments on the body. Of those which were, only a very small portion have been exhumed, and in some instances the slight depth of earth has not prevented the decay and disappearance of copper relics. It is only recently that our citizens have turned their attention to the general search for relics, or to their preservation when found.

It will require another half century, perhaps a century, to fully develope by private means the remains of the mound-builders, which exist in nearly every county in Ohio. It is very probable that some things in this list, the locality of which is given as unknown, may not have been found within the limits of the State.

I adopt a provisional nomenclature, and for each group of articles give a brief general description, enough to enable every one to see to what class they belong.

No articles of bronze or of brass are known, that can be attributed to the mound-builders of the Ohio valley, nor any of copper that have been melted or cast in molds.

Axes and Adzes.

The most common of ancient copper implements in Ohio, are called *axes;* but some of them could as well be used for adzes or chisels.

They are long, narrow, thin and flat, the cross-section being generally a rectangle; weight, one to four pounds; length, three to nine inches; manufactured by beating out nuggets of native copper, in a cold state, or, if heated, never melted. Both the ancient Romans and Peruvians had similar tools, to which handles or helves were attached externally, without an eye or any perforation. None of the mound-builders' axes are perforated for the purpose of a helve. The bit is wider than the body of the tool, which tapers toward the poll.

If the bevel of the bit is only on one side, it may be inferred that it was intended for an adze, with a handle fastened at right angles to the

flat side. These tools could also be used as scrapers of charcoal from burnt wood. Nearly all of them are found in mounds, and if they are not deep in the earth, are corroded, their metallic portion changed to the green carbonate of copper. Their number and location is as follows:

Butler co nty—from ancient mounds	7
Summit county	2
Clarke county—from mounds	5
Ross county—from mounds (one with a double bit)	5
Licking county—from ancient mound	1
Hamilton county—from ancient mound	1
Franklin county—from ancient mound	1
Locality unknown	11
	33

Chisels and Gouges.

In form, it is often difficult to separate these from axes and adzes; but in size they are generally smaller. They were probably inserted lengthwise in a wooden handle, to be used single handed. Like the axes, they could be used not only as scrapers of wood, but as scrapers of charcoal. None of these edge tools are hard enough to cut solid wood to much advantage. Their dull edges show that they could not have been much used for that purpose.

Ross county—from mounds	2
Pickaway county—from mound	1
Summit county—from mound	1
Locality not known	5
	9

Spear, or Lance-heads, and Daggers.

These weapons differ principally in size, not in form. They were attached to a staff, or handle, by means of a socket, in which it was inserted; or by a pointed shank, which could be driven into a handle of wood. The cross-section is sometimes flat on one side, and rounded or triangular on the other; or it is a double bevel, both curved and triangular. The point and edges are sharp, and the blade straight.

In Ohio, they are not as numerous as in Wisconsin and Michigan. They are known to be sixteen inches in length.

Ross county	1
Hamilton co.nty	1
Locality not known	4
	6

Knives and Cutting Instruments.

These are frequently in the form of a modern knife, with an edge, and a pointed shank to be inserted in a wooden handle. Another style is crescent form along the bit, like a meat-chopper, or saddler's knife. The

holder, or handle, appears to have been fastened lengthwise to the points of the crescent. Only one has come under my observation from Ohio, which is from a mound in Summit county.

Borers and Drills.

Bodkins, drills, borers, awls, and needles, are very much alike, except in size. They are slender, generally round, and pointed at both ends. Their uses were as perforators of wood, raw-hide, and the rude cloth of the mound-builders.

Perhaps they were employed to that effect in stone, by rapid revolution, but not to a great extent. There is one in the Wisconsin collection, thirteen inches long, which was probably held in the middle and twirled by hand, or by a long string. Some are square, and others five or six-sided.

The smaller ones, answering to an awl, or needle, are generally pointed at but one end, and have a shank which was inserted in a handle of bone, horn, or wood. In this State, only a few have come to light:

Erie county	1
Ross county	3
Washington county—from mounds	3
Summit county	1
	8

There are other ancient copper articles, designed for domestic use, such as spades, bark-peelers, mauls, wedges, and gads, which do not yet form a part of our collections.

I now give a list of ornaments, badges, and insignia, of copper, a branch of art on which the pre-historic races bestowed their highest skill and great labor.

Tubes used as Beads.

In many of the ancient graves, there are found strings of beads around the necks of skeletons. They have been known to number several hundred, and are made of bone, shells, the teeth of animals, and of copper.

Those of copper are generally fabricated by rolling thin and narrow strips around a small rod, after which the roll was beaten into a more compact body, in a cold state. Some are small pieces of copper, with a small hole punched in the center.

Hardin county—mound	38
Licking county—mounds	100
Ross county—mound (several more melted together)	4
Cuyahoga county—mound	3
Washington county—mound	1
Locality not known	4
Fairfield county—mounds recently opened by Prof. E. B. Andrews	500
	650

Head, Breast, and Ear-Plates.

Copper plates, of various shapes and sizes, have been found on the heads and breasts of many skeletons in the mounds. They are more frequently called "gorgets," because it is presumed they were suspended at the throat, as insignia of rank, or as decorations. The Indians of Florida, when the Spaniards first knew them, wore similar plates of copper, sea shells, and of stone, all highly polished. Some of them had figures carved upon them, which probably had a meaning, and were capable of being read by the aborigines. They are generally perforated with one, two, or three holes, for suspension, or for the purpose of attachment to the person.

Hardin county mound, quite large	1
Washington county mound, quite large	1
Ross county mound, thin and light	3
Licking county mound, very much decayed	1
Hamilton county mound, one of them grooved	2
Unknown, with four arms	1
	9

Pendants.

Articles in the form of ear bobs or pendants, both flat and round, are very common on the surface and in the mounds, but most of them are of stone or iron ore. Those of copper are very rare. At the small end there is a groove or a beveled hole for suspension. The smaller ones were worn at the ears and nostrils, and the larger ones suspended around the neck, probably in strings, like beads and other ornaments. In this State I know of only one, which is from a mound located at Marietta, and on which is a patch of native silver.

Bracelets.

Copper rings are frequently found on the wrist bones of skeletons. They are a rude rod made long enough to encircle the arm, bent to a circle, the ends not joined, but sometimes overlapping each other.

Licking county stone mound	13
Ross county mounds	11
Athens county mounds, several	—
Grave Creek mound, near Wheeling	5
Locality not known	1
	30

Buttons, Studs, and Bosses.

Several ornaments have been exhumed from mounds of sepulture, which go by the names of bosses and buttons. Many of them resemble the modern stud or bosom button, but are of larger size, and the column

which unites the discs is hollow. They have been found with a diameter of one and a half inches. Besides these there are small cups, less than an inch across, with holes at the edges, as though they were attached to a string. The studs were also strung together like beads. By some authors they are regarded as spools for thread, one having been found by Dr. Jones, in Tennessee, with a thread-like fiber on it.

Washington county mounds	3
Hamilton county mound	1
Licking county, in an ancient grave	several.
	4

PLATES AND MISCELLANEOUS ARTICLES.

Hamilton county—a large piece partially wrought, with a patch of silver	1
Butler county—weight, 8 pounds	8
Licking county—with longitudinal grooves	1
" large, thin sheets in the form of a cylinder	2
Ross county mounds—in thin strips	20
" several small plates nearly consumed by rust	—
" a copper cone, hollow	1
	33

RECAPITULATION.

Utensils and Weapons.

Axes and adzes	33
Chisels and gouges	9
Spears and daggers	6
Knives and cutters	1
Borers, awls, etc	8
Total	57

Ornaments and Insignia.

Buttons or studs	4
Tubes or beads	650
Head and breast plates	9
Pendants or bobs	1
Bracelets	30
Plates, etc	25
Total of copper relics	720

CHAPTER IV.

STONE RELICS.

The first step towards an intelligent study of relics is the selection of names and definitions. When a nomenclature is agreed upon, they can be classified; and when this is thoroughly done, the subject will assume the form of a science.

These articles may be arranged according to the material from which they were fabricated, under the following heads: *Stone, flint, copper, shell,*

bone, *horn*, and *pottery*. Under these headings there are subdivisions into those for *domestic* use, for *ornament*, and for *war* or *hunting*. Their forms are almost infinite, and the study of them is full of interest.

The terms used in Europe have only a partial application here. We can not entirely ignore them, although we have no age of polished as separate from unpolished implements. Here the stone and the metal eras are one, and of equal antiquity.

None of our stone axes are made with holes or eyes for the insertion of a helve, but are grooved to receive a withe twisted into the form of a handle. Our flint implements resemble those of Europe more closely; in truth they are quite similar the world over.

It is impracticable to separate the relics of the mound builders from those of the more recent red men, by a classification based upon their forms.

For the present, I adopt such English terms, as appear to give the best idea of the object described, but there is great difficulty in drawing the dividing line between groups.

Many relics were adapted to more than one use or purpose, and there is often room for discussion as to which class they most properly belong.

Dr. Chas. Rau, of New York, in his recent description of typical articles in the Smithsonian collection, has given material assistance to the cause of a better nomenclature. We there find that our lists of flint arrow-heads must be very much curtailed, and that those which exceed an inch and a half in length, were not used as arrow-tips, but as *cutters*, performing the functions of a knife. The grooved double-ended mauls may also have been used for net-sinkers.

Under the head of *ornaments*, the Ohio cabinets present a very great variety, which it is nearly impossible to classify.

Highly polished stones of elegant proportions, are very common both on the surface and in the mounds. As the modern Indians are not known to have used badges or insignia of stone, it is fair to infer that most of them belong to the mound-builders. Articles which are found in mounds in such a position as to show them to be as ancient as the mound itself, are the only ones which can certainly be attributed to the mound-builders, though I consider that a large part of the surface-finds are also as ancient as the mounds.

Mr. Jones, in his work on the Southern Tribes, has made it quite probable, that their ancestors built the earth-works and mounds, of the Mississippi Valley.

The differences between the Northern and the Southern tribes, are those rather of cultivation than of race.

STONE AXES.

FIG. 11.
Typical stone axe.
Licking county, Ohio. ½ nature.

Under this head is included all wrought stones with a groove, a poll, and a bit. They are polished, partially polished, and unpolished or rough. The bit is made sharp by rubbing, and the material is hard and tough, generally of trachyte, greenstone, granite, quartz, or basalt. Most of them are straight on one edge. In Ohio it is very rare that stone axes are found in mounds, which indicates that they are modern, or were not so much prized by the mound-builders, as to be objects of burial. Nothing can be inferred in regard to their age, by the fact that they are polished. Occasionally there are axes of softer material, such as slate, hematite, and sandstone; but these are small in size, and not common. They appear to have been manufactured from small oblong boulders, which were first brought into shape by a pick or chipping instrument, the marks of which are visible on nearly all of them. They are made more perfect by rubbing and polishing, probably from time to time, after they were brought into use. A handle or helve was fastened in the groove by thongs of raw-hide; either a wythe, a split stick, or a forked branch. The bit is narrower than the body of the axe, which is not generally so well balanced as to be of much value as a wood-cutting implement. It is very seldom the material is hard enough to cut green and sound timber. The poll is generally round, but sometimes flat, and, rarely, pointed. It is much better adapted to breaking than cutting. The smaller ones are better fitted for war-clubs than tools. As a maul to break dry limbs it would be very efficient, and was probably put to all these uses. In weight they range from half a pound to sixteen pounds, but are generally less than three pounds. The heavy ones must have been kept stationary at camps and villages. Without beasts or vehicles for transportation they would not have been carried far, even in canoes. The Hon. Harvey Rice discovered a pile of them in the woods near Sandusky, Ohio, many years since, which were evidently new, not having been used or polished. One of the lot is now in the cabinet of the Western Reserve Historical Society. Such axes were in use by the red Indians when they were first met by white men, and are now, among the frontier tribes. The mound-builders apparently did not

give them as prominent a place among their implements, as their more savage successors.

Hammers and Mauls.

Fig. 12. Grooved hammer. Rockport, Cuyahoga county, Ohio. ½ nature.

Double-headed hammers have a groove at the middle. They are made of the same hard material as axes, so balanced as to give a blow with equal force at either end. Their mechanical symmetry is often perfect. As a weapon in war they were formidable, for which purpose they are yet used on the Pacific coast. Mr. A. Hamilton, of Steubenville, has one recently brought from Oregon, with a sheath of raw-hide around the middle, covering a large part of the stone and its wythe handle. It is a very efficient weapon and a good maul. The smaller ones are now used to break pieces of flint or obsidian into flakes for arrow-points, knives, daggers, and the like. There are great numbers of small, half-formed balls, which appear to have been hand hammers. Some have a flat belt around the middle, as though a groove had been commenced. Many are merely oblong, oval pebbles, with an indentation on each side, for the thumb and finger. Others are of irregular shape, like broken stones of one-fourth to one-half pound weight, with the corners chipped off.

There are incipient balls in all conditions of completeness. They could be, and possibly were, used as sling stones or slung-shot. It should always be kept in mind, that almost every article has more than one use.

In its rough state, the stone could be a pick, hand-hammer, or chipper, used to reduce another stone, while it was also being reduced itself to the proper shape. It might then be rubbed into a more spherical shape on an axe, maul, or pendant; while both were being polished by one process. It could then be covered with hide, and a thong attached to it for a billy or slung-shot, or it might have a groove chiseled around the stone, and a wythe handle made fast to it as a hammer. Some of the small ones have holes bored through them to be suspended as ornaments. They may also have answered the purpose of marbles, in those games for which savages have an ungovernable passion.

Perforated Balls.

Fig. 13. Hematite, Frieze mound, Cleveland, 1-2.

Fig. 14. Striped slate, Northern Ohio, 1-2 nature.

BALLS MORE OR LESS POLISHED.

I am inclined to think the small, irregular balls with an edge around the middle, and flat faces on the sides, were used as chippers. They are very numerous, embracing a great variety of material, such as flint, sandstone, greenstone, and quartz. They are never finished systematically, as if intended for an ornament. The perforated balls are often as irregular in form, but are generally made of green striped slate, and polished. They are in a condition to be worn suspended as ornaments

Those above referred to are rough and have small dents, or fractured faces, which would come of using them in the hand as picks and chippers, for trimming and working down other stone articles, into shape for the rubbing stone and polisher. I have tried the flattened pebbles, with a depression on each side, which are called "thumb and finger stones," as chippers for flint, and find they answer the purpose very well.

The fabrication of so many thousand articles required thousands of tools of some kind, for rough finishing.

These irregular balls come nearer to that purpose than any thing yet discovered. If they are not the true chippers, they must have been made of wood or horn, with points of stone inserted, none of which have been found.

There are miniature picks of quartz, but none of them are large enough for real work of that kind. They appear to fill the requirements of a plaything, or of an ornament for suspension, better than those of a working tool.

FIG. 15.
Size of nature.
Unpolished black flint,
Ohio River.

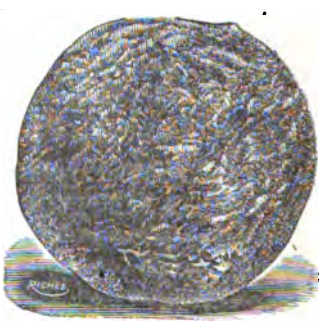


FIG. 16.
Size of nature.
Granite, partially polished,
Northern Ohio.

FLESHERS AND SKINNERS.

Most of the chisel-form implements, called "celts," were probably used as aids in peeling the skins of animals from the meat and bones. For

the purpose of cutting tools for wood they are not sufficiently hard, and do not show the signs of such an use, with the exceptions of a few flint chisels. They may have been applied as coal scrapers where wood had been burned, but this could not have been a general thing, without destroying the perfect edge that most of them exhibit. The grooved axes were much better adapted to this purpose. If the flint implements were treated of here, there would appear to be among them a large number of cutting tools or knives. These would do the work of ripping up skins and cutting the meat. When the ripping was done, the round hand-chisel with a straight bit is an excellent tool for peeling off the hides. Four of them have passed through our hands which were in the form of gouges. On one side a groove is sunk parallel with its axis, and the bit is thus made, curved in the form of a gouge. One of these, in the cabinet of the Western Reserve Historical Society, is represented in the engraving herewith.

FIG. 17—1-2 NATURE.

Gouge-Form Skinner—Polished Limestone. Location not known.

This would fit around a bone for skinning or peeling off meat. The mound-builders probably skinned animals whole, as they do in Asia; tying the legs so as to form buckets, bags, water-carriers, and bottles. They were without beasts of burden, and must have used a large number of such things to carry water, grain, earth, and whatever they were obliged to transport on land. The embankments and mounds which they have constructed appear to have been made of small parcels of soil such as might have been brought in a bucket or basket. The Assyrians raised earthworks in this way, the labor of which fell on their Jewish captives.

Fig. 18.

Quartz Pestle—1-2 Nature. Northern Ohio.

Grain Crushers.

Processes for mashing seeds and grain are known among all people, even the most ancient and rude barbarians. There is quite a similarity in the processes by which far the largest part of the subsistence of the human race has been prepared. Hand-mills or corn-grinders continued in use in Europe as late as the tenth century, and are still in use among savage nations. A large part of the food of the Mexicans is now ground in this way, as it was by the Aztecs and Toltecs. A Mexican "metate" or grain rubber may be seen in the Historical Museum at Cleveland. The upper stone is boat-shaped, and is shoved back and forth over the grain, which lies in a depression of the nether stone. The latter is thirteen inches long and nine inches wide, and the depression is seven inches across. It differs very little from those used by the natives of Central Africa.

Rubbing stones are not as common in Ohio as pestles, and stone mortars are very rare, which indicates that they were made of wood, which is light and more easily transported. There are circular depressions on the rocks like those at Kelley's Island, which may have been used as fixed mortars. Most of the pestles are short, with a wide base, and taper towards the top. These were, probably, used in one hand and moved in a circle. These fixed mortars have a bilge in the center like the bottom of a plate pressed upward. The long round implement usually called a pestle does not appear to be fitted for crushing seeds and grain by pounding. It is probably a rolling-pin, used, perhaps, on a board or log, and not upon stone. It is seldom smooth or polished, and varies from seven to thirteen inches in length. The outline is not straight, but tapers towards the ends, which are generally circular and smooth, as though they had been twirled in an upright position.

Mortars.

Mortars for grain crushing are common on the western coast. I know of only one in the Mississippi Valley that is in a perfect condition, which

is in the collection of the Indiana Geological Survey. Its appearance, however, is not that of an ancient article. The pestles of the California Indians are more elegant than ours, having a taper towards the top, and a knob. There is a flat rubber, of brown slate in the collection of the Western Reserve Historical Society. This form of a grain crusher is fully as simple, and probably as common, as the pestle.

A large, detached rock of limestone, at Kelley's Island, half a mile east of the landing, is covered with platter-shaped depressions, which were used for some purpose by a circular motion. In the center the space is not worn away, but rises like a dome, with a circular depression around it. They are from eight to eleven inches in diameter, and one-half to one and a half inches deep, standing at all inclinations on the top and sides of the rock. Detached mortars of this form are common on this island. These may have been used as grinders, with the short pestles, which have an enlarged base. An ancient earth-work is near by.

Nothing has been found answering to the Mexican metates, or the rubbing stones, which are common in the interior of Africa, or the ancient quoins, of the British Isles. People in the savage state had less use for grinding processes, than when they advanced towards a better condition. These processes would, of course, improve as their mode of living changed from wild meat, to the products of the soil.

Modes of crushing grain are easy of invention, and construction, either in stone or wood.

The pioneers of Ohio and Kentucky used the top of a stump, hollowed out by fire, in which a huge wooden pestle, suspended from the end of a spring-pole, served to mash their corn.

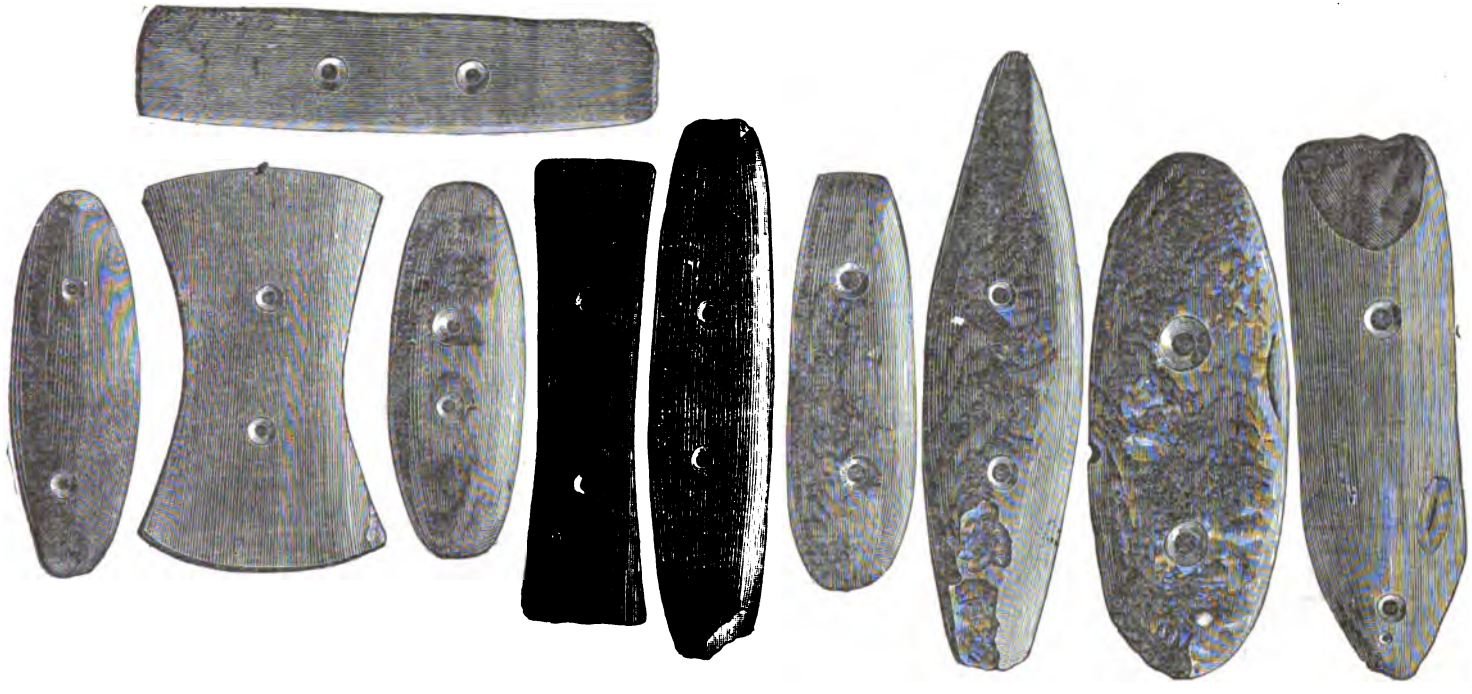


PLATE VII—1-2 NATURE. ASSORTED SHUTTLES FORM STONES—NORTHERN OHIO; COLLECTION; OF THE FIRE LANDS HISTORICAL SOCIETY.

PERFORATED PLATES, THREAD-SIZERS, SHUTTLES, ETC.

There is an almost endless variety of these implements, generally made of striped slate, most of which have tapering holes through them flatwise, the use of which has been much discussed. In this plate I have endeavored to give samples of those hitherto brought into notice, but there are, no doubt, many other forms and styles. They are, generally, symmetrical, the material fine grained, and their proportions graceful, as though the principal object was one of ornament. Many of them may well have been worn suspended, as beads or ornaments. Some partake of the character of badges or ensigns of authority. Others, if strung together on thongs or belts, would serve as a coat of mail, protecting the breast or back against the arrows of an enemy. A number of them would serve to size and twist twine or coarse thread made of bark, raw-hide, or sinew, but this most common theory is lacking one important feature. None of them show signs of wear by use. The edges of the holes are sharp and perfect. This objection applies equally well to their use as suspended ornaments. Some of them are shuttle form, through which coarse thread might have been passed, for weaving rude cloth of bark or fibrous plants, such as milk-weed or thistles. There are also double-ended and pointed ones, with a cross-section, every where a circle and a perforation near the middle.

I know of no instance where modern Indians have used such pieces for any thing but ornament. They find other means to size and twist threads, bow-strings and twine.

FLAT PERFORATED STONES.

I think we must give up the theory that the various forms of polished slate, perforated at right angles to the face, were used as sizers and twisters for twine or strips of skin. They are all bored with a taper that leaves a sharp edge either at one side or the middle of the piece. Those that are more or less worn, have the appearance of having been suspended.

Thread-twist·rs and sizers were probably made of wood and bone, like the Iroquois shuttles, figured by Mr. Schoolcraft. Some of their perforated stone implements somewhat resemble ours in their general form.

Most of the striped slate relics I am inclined to place among the ornaments, badges, and armor of the ancient tribes. Some of them would answer all these purposes. The tapering holes are a good contrivance for a fastening by thongs of raw-hide, to a beltstring or piece of wood. Supposing the head or knot of the thong was let into the beveled hole, these plates might be firmly bound to each other, or to the body of the wearer, and the holes not be much worn by the process.

These relics are in a great variety of form. They are nearly all fabricated from striped and variegated slate, highly finished, very symmetrical and elegant in proportion, evidently designed to be ornamental. If they were stronger and heavier, some of them would serve the purpose of hatchets or battle axes. The material is compact and fine-grained, but the eyes or holes for handles or staves are small, seldom half an inch in diameter. Their edges are not sharp, but rounded, and the body is thin, generally less than one-fourth ($\frac{1}{4}$) of an inch.

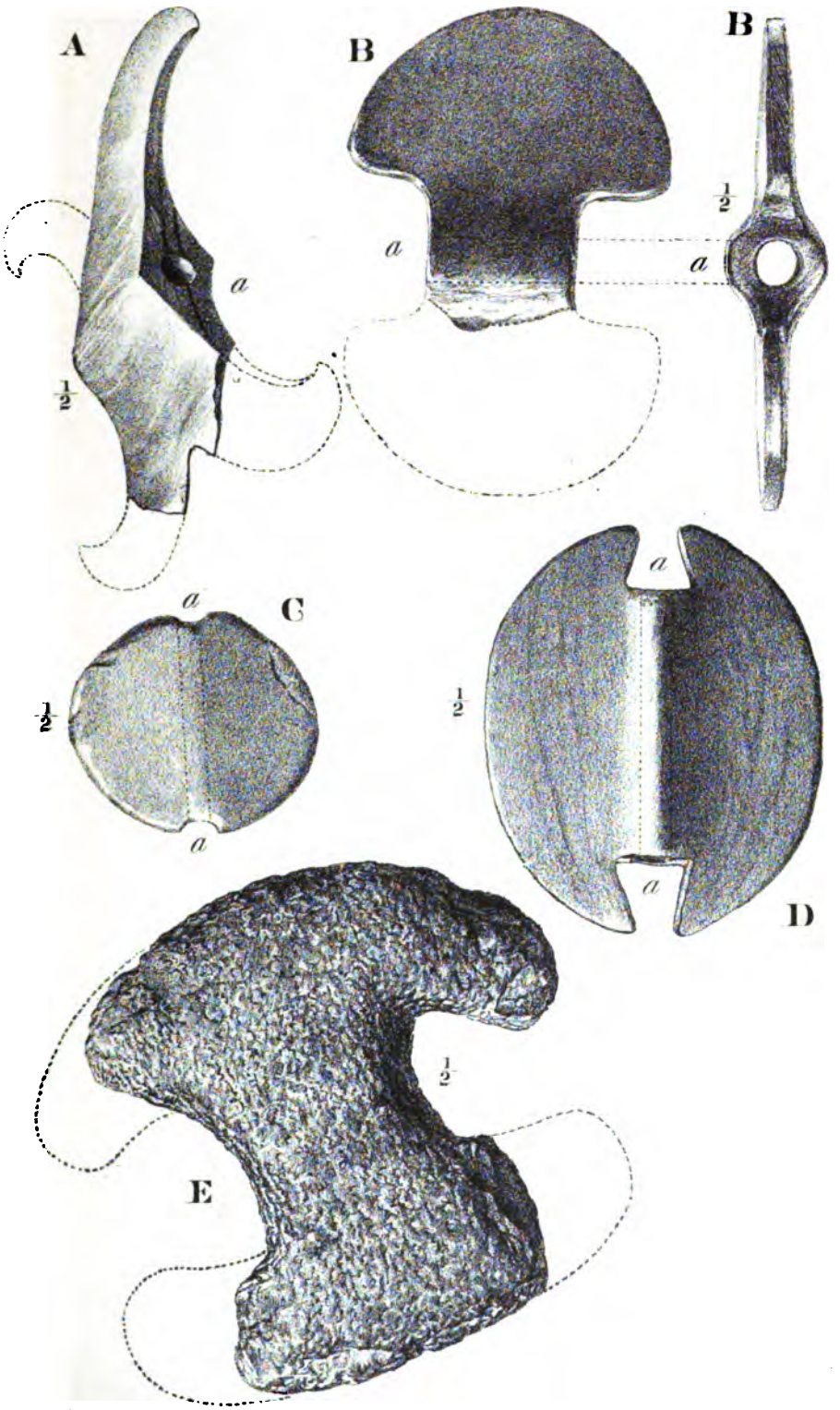
This variegated slate is not known in Ohio, except among the drift gravel. It constitutes large masses on Lake Superior and the waters of Green Bay, having various colors, where it is known, geologically, as the siliceous metamorphic slate of the Huronian and Laurentian series. This is the source of the pieces found in our gravel, transported from the north during the ice period. Nuggets of copper and iron ore are occasionally secured from our gravel transplanted from the same locality by the same agency. The ancient manufacturers of these badges must have brought the larger pieces from beyond Lakes Michigan and Huron, as they did the copper, from mines which they wrought there. Green, greenish-gray, and brown stripes seem to have suited their tastes. These slates are siliceous and tough, but come out in thin layers. For ornamental purposes they faintly resemble the green stones, which the ancient inhabitants of Central America and Mexico prized very highly, under the name of "Chalcihuites." I think most of those scattered over Ohio are the work of the mound-builder race. A large number have been taken from ancient mounds. Their style and finish corresponds to the mechanical execution and taste of that race. They come into the same category as the polished tubes, pendants, and gorgets from the mounds. The more modern tribes may have used ornaments and badges somewhat similar, but if they had been common, and equally beautiful, this fact would have been conspicuous in the history of those tribes.

DOUBLE CRESCENTS.

This form of badge (Plate VIII, letter A), being the most elegant and expensive of those yet brought to our notice, was probably used to indicate the highest rank or office.

The single crescent probably signified a rank next below the double. In Mr. Matson's collection is a rough-hewn double one in process of construction, the horns of which turn inward. In all the finished ones I have seen, the points turn outward. The finish around the bore of all

BADGES OR WANDS



winged badges and the crescents is the same, and the size of the bore about the same, from four-tenths to six-tenths of an inch.

On one side of them all is a narrow ridge; on the other, a flat band lengthwise, like a ridge that has been ground down to a width of one to two-tenths of an inch. Badges and crescents are invariably made of banded slate, generally of a greenish shade of color. The other forms of wands or badges, such as these with symmetrical wings or blades, are also made of green striped slate, highly polished, with a bore of about one-half inch in diameter, apparently to insert a light wooden rod or staff. They were probably emblems of distinction, and not mere ornaments. I know of nothing like them in use, either in form or finish, among the modern tribes, and, therefore, refer them to the mound builders.

PLATE VIII.

It is not easy to draw the line between ornaments and badges. Figure A, with two wings or blades, the outline of which is in chapeau form, belongs to the collection of the Licking County Pioneer Society of Newark, Ohio. A^1 is a view of the same edgewise from the lower or straight side. The material is a reddish-brown striped slate, the parts wrought to the most perfect symmetry. On the upper side the ridge, parallel with the eye or bore, is sharper and more prominent than on the lower side, which is a common feature of these relics. I can not give its location.

B is another form of the same series, from a cast in the collection of O. Gates, of Columbus.

C might be classed among the ornaments or tubes. It is from the surface, near Ashtabula, Ohio, in the collection of the Pioneer Association of that county.

D is similar to C, the sides made a little wider and thinner, with notches at the ends more deep than usual, to meet and shorten the bore. It is in the collection of Dr. Craig, of Mansfield, Ohio.

E, from the cabinet of the Fire Land Society, approaches the form of a flattened ball, the edges being blunt.

F represents a very neat double-pointed mace or bill, from the collection of Dr. Kirtland, evidently an ornament or badge. The material is a rich brown mottled stone, not hard, with gracefully rounded ends, but too light and slender for any practical use. The locality is somewhere in Northern Ohio.

PLATE IX.

Figure A is an oblique view of a portion of a double crescent of green slate, in Mr. Matson's collection, restored by the dotted lines. Since the

engraving was made, the three remaining horns have been added in plaster, using this one as a model. Thus we have restored this highest form, of the artistic skill of the mound-builders. To comprehend its beauty fully, the engraving should be colored according to nature. In Figure 114, page 218, of Squier and Davis's Monuments of the Mississippi Valley, is one with all parts complete, but executed with much less artistic merit. It is from some part of the State of Mississippi, and ours from Richland county, Ohio.

E of Plate IX is the rough outline of one in Mr. Matson's Cabinet; the horns of the crescents curving inwards. In the Western Reserve Historical Society's Museum there is another in the rough state, merely chipped into shape, which, when finished, would closely resemble figure A. It is from Northfield, Summit county, Ohio. Another in the rough, from Ashtabula county, Ohio, was in the exhibition, loaned by the Rev. S. D. Peet. The material is in all these cases a dun, a drab, or a green, striped slate, susceptible of polish.

B B of this plate represent the edge and one blade of a double-edged wand of chalcedony, in the possession of O. Gates, Esq., Columbus, Ohio. Its proportions and polish are perfect. Its color is a rich, variegated orange, cream, and white.

B is a view edgewise, both blades represented. Among the ruins of Pompeii is a Roman double bitted axe of bronze, almost the counterpart of this in form. Mr. Squier, in the figure above referred to, has described one closely resembling this, purporting to be from Mississippi.

Figure C is a common form of slate badges.

D is a rarer form, very well finished and ornamented.

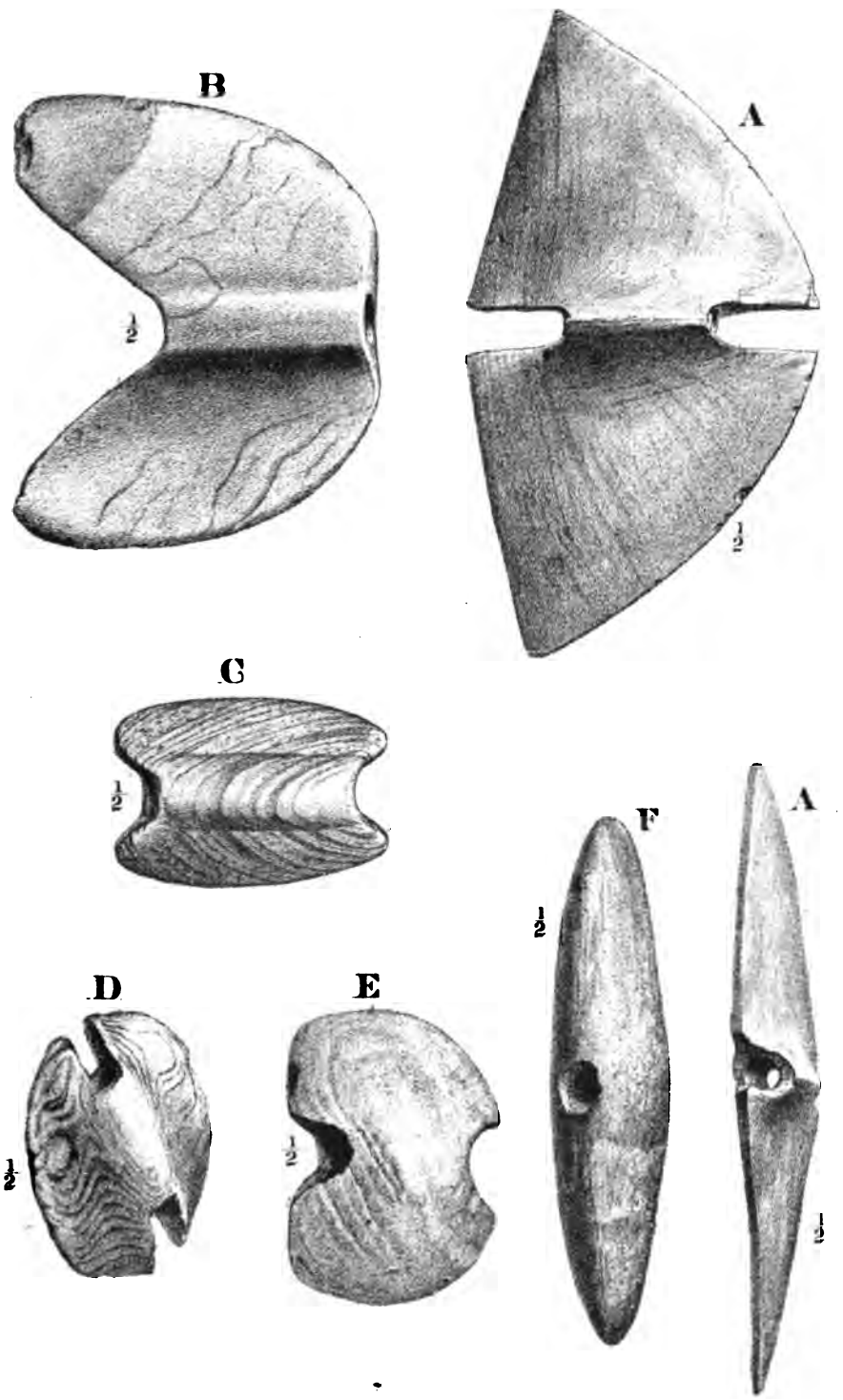
Tubes—Plate X.

It is not easy to devise the uses of such a variety of stone tubes. I am not aware that the French, Spanish, or English chroniclers, who first came in contact with the red men, make mention of them. Some writers regard them as a telescopic help for distant views—a purpose to which the largest and best of them may have been applied.

From Crawford county, Pa., one is reported twenty (20) inches in length, with a bore one inch in diameter, but not in the axis.

Some of them are also capable of being used as calls, or whistles. They are found among the relics of the Pacific coast, buried so deep beneath the surface, as to give them an antiquity equal to the closing out of the drift period. They are very common in the mounds, and are, therefore, among the earliest of artificially wrought stones. Those found on the

BADGES OR WANDS



surface are probably of the same era. All of them are polished with care. The material is generally a fine-grained striped slate, the same as the flat pendants, thread-twisters, shuttles, and badges. They all have excellent proportions and a symmetry of form quite marvellous, when we reflect that the work of boring, trimming, and polishing must have been done by hand, guided only by the eye.

Ancient quarries of this material probably will come to light on the waters of the upper lakes, like those of mica in the Black Mountains of North Carolina, and the old mines of copper on Lake Superior.

The short oval tubes, with symmetrical bores, are doubtless ornaments which were strung like beads upon cords or belts. Many of them show signs of wear by such suspension, both in the bores and on the surface. Schoolcraft describes a tube, in the form of a truncated pyramid, about three inches long and three-fourths of an inch square at the base, which was worn by the Mandans on strings around the neck. Several forms of the flat perforated stones were probably worn as decorations.

On plate No. X a number of the most common forms are represented. All are of full size, except B B^1 B^2, from the "Tippett Mound," Licking county, Ohio, which is reduced to one-third of nature.

A A^1 is a profile and cross-section of one taken from the "Frieze Mound," Cleveland, by the late Mr. Goodman and myself. It is of fire-clay rock, highly polished, the bore perfectly true, tapering slightly towards a notch or shoulder at the smaller aperture. It is now fractured, but while it was perfect, by blowing in the small end, a very sharp sound or call was produced, which, in still weather, might be heard a quarter of a mile.

B^1 is a side view of the "Tippett Mound" tube from a depth of (6) six feet under the apex, and (15) fifteen feet above the base. The drawings were furnished me by the late David Wyrick, of Newark, Ohio. Its upper end is flattened like a whistle or flute, and there is a hole just below the mouth-piece, which indicates that it may be a musical instrument.

B^2 is a view of the side opposite B^1.

B^3 is Wyrick's profile lengthwise through the axis.

A large one, closely resembling this, is reputed to have been brought to light in digging a cellar on Euclid avenue, Cleveland, in 1833, but it was not preserved.

In the museum of the Western Reserve Historical Society there is the lower end of one found on the surface in Northfield, Summit county, Ohio. It was, apparently, as long as that from the "Tippett Mound," but, externally, not quite as large. It is of a material which may be a soft slate, or half indurated fire-clay, and well polished. A smaller tube of

hematite, but broken near the middle, is in the above collection taken from a mound in North Hampton, Summit county, Ohio. It is about the size of E E, with the smaller end gone.

C C^1 represents one found by Mr. Frank Glover, of Columbus, Ohio, somewhere on the Scioto valley, and now in the cabinet of O. Gates, Esq., of Columbus. A portion of the smaller end is wanting, and the bore is not exactly concentric with the exterior.

E E^1, from the cabinet of J. S. B. Matson, is a fair representative of the most common form. Mr. M. has one taken by himself from a mound in Hardin county, Ohio, which he believes to have been used as a pipe.

F is an interior view of another found on the surface in Willoughby, Lake county, Ohio, split in half, lengthwise. It is a brownish slate, and probably belongs to the class of bead-like or suspended tubes.

D D^1 D^2 represents two profiles lengthwise of another form of tubes, probably for ornament, the bore eccentric, and one side flattened.

These tubes were evidently very common. They may have been used for calls, answering to the tin horns and conch shells of our early settlers. A large one, such as we have figured, 7½ inches in length, with a hole in the side like a flute, may have produced such rude musical notes, as the northern Indians make on their wooden flutes.

CHAPTER V.

Ancient Burial Mound and Its Contents.

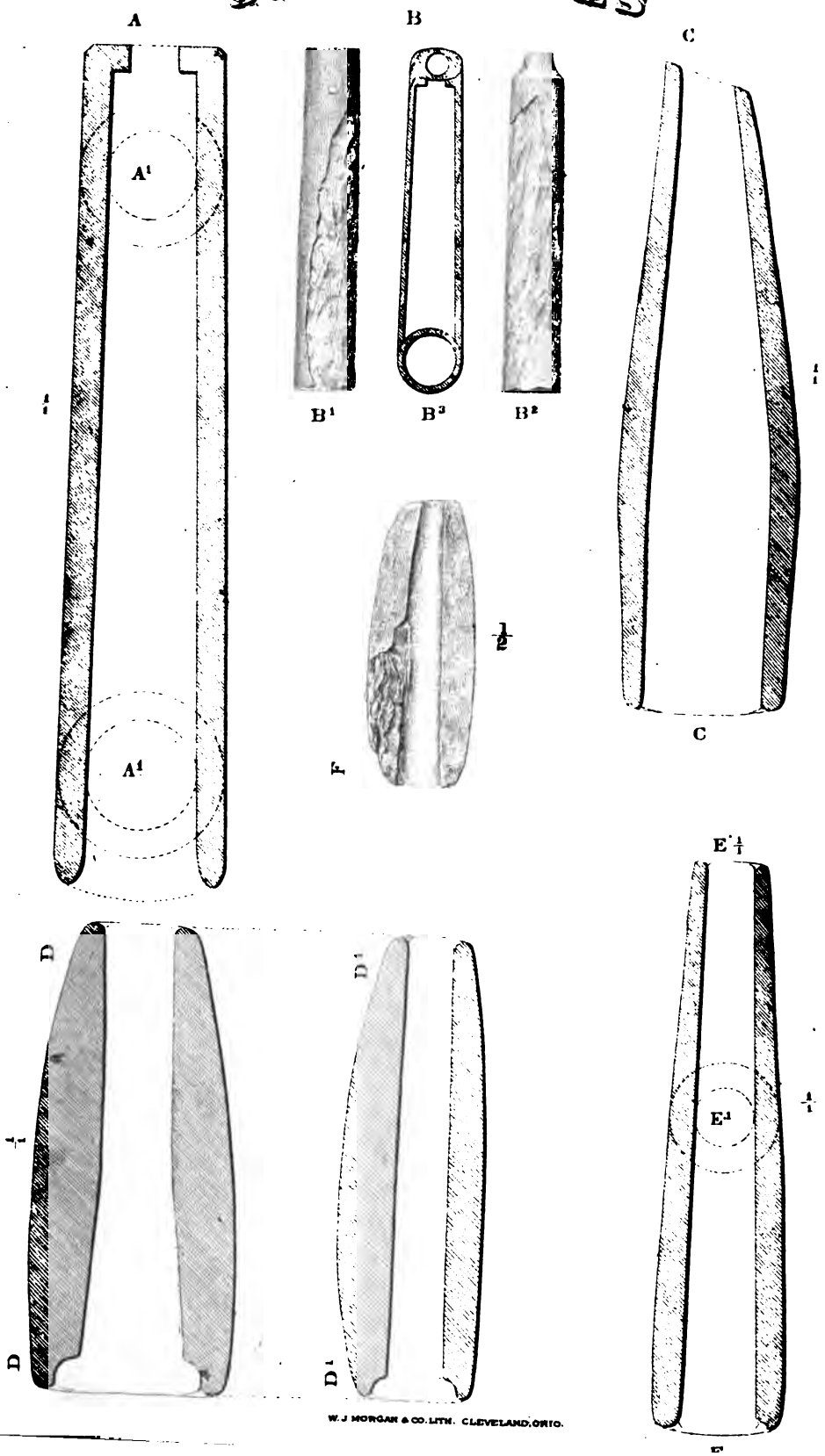
The following letter from John S. B. Matson, Esq., gives an account of the opening of an ancient mound in Hardin county:

Dear Sir: In the fall of 1856, in Hardin county, Ohio, near the Bellefontaine and Indiana Railway, between Mt. Victory and Ridgeway, I commenced removing a gravel bank for the purpose of ballasting a part of the above named railroad. I learned shortly after my arrival there, that the bank was an ancient burial-ground. This information caused me to examine the ground, and note discoveries.

Before I came on the ground, there had been a track graded and laid. This track separated a short distance east of the mound, one track on the south, the other on the north. The men who graded the track, had taken the loam off where the track ran, and cast it out from the mound. We removed the gravel from both sides, moving the track up to the bank, when it became difficult to load. The loading was done by men with shovels into gravel cars, and hauled out with an engine. The average amount removed was about two hundred and twenty cubic yards per day. About six weeks in the winter we had to suspend operations, on account of freezing. The mound covered an area of *one and a half acres;* being covered with an orchard of apple trees, then in bearing. Several stumps and a few trees of the original forest still remained on the mound. I was informed by citizens of the vicinity that there had been a remarkably heavy growth of timber on the mound. The stumps remaining were large. The mound was what I would call double; the larger and higher part to the west. About two-thirds of the mound was

PLATE Nº 10.

STONE TUBES



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embraced in this part. The eastern part presenting the appearance of a smaller hill having been pressed against the other, leaving a depression between them of three or four feet below the highest point of the smaller and five or six feet below a corresponding point of the larger. Both parts had the appearance of having had surface work done, to give them a beautiful oval shape. The loam I found deepest on the highest points, where it is generally of less depth. The interior was composed of a clean limestone gravel and sand, evidently formed by decomposition of the strata, and very plainly marked. In the eastern or smaller part of the mound was an excavation that had been made by citizens of the vicinity for sand for building purposes, in which excavation I learned a number of skeletons had been exhumed having beads and trinkets on, which were reported as being similar to those I afterward found. I was unable to obtain any of them. A little south of the highest point of the western mound was an excavation made by the railroad company for the purpose of ascertaining the amount of gravel. No remains were found in that excavation. Shortly after commencing to load gravel, indications of graves were visible in three places, on both sides of the eastern part, and nearly north of the center of the larger or western part. At the last named place, two skeletons, side by side, were found in a horizontal position; the feet pointing east, which had been deposited there without their heads, there being no evidence of skulls. With them I found a stone axe or celt of granite, two flint arrow points, and an implement made of blue stone resembling slate, but much harder, the outlines of which I give full size; also a large fresh water clam, filled with red paint, in good preservation.* The flint implements had the appearance of never having been used, being very sharp-pointed. The bones crumbled on exposure to the atmosphere. These graves were about four feet deep. The first skeletons taken out of the eastern part of the mound were in better preservation, especially those on the south side. Several skulls were sound, and the other bones of some were so well preserved that, by applying sole leather for ribs, they were wired together. With the first skeleton taken out of this part of the mound, I found a thin piece of ivory, with two small holes, evidently an ear ornament. Next was the skeleton of a little girl, who may have been eight or ten years old. Skull in good preservation, which remains in my cabinet. She had a string of beads, so made as to be larger in the center of the neck in front, tapering almost to a point at the back of the neck; she also had a plate of copper on her neck. The lower maxillary and upper joints of the vertebra are yet green from its oxidation. The plate had two rows of dents a part of the way around. The dents look like an impression made on a board with the heel of a boot with tacks. The two last skeletons had been buried in a sitting posture. On the north side, nearly opposite the last named skeletons, was a grave about four feet deep, in which the remains had been deposited and apparently burned. There were ashes and charcoal, with pieces of charred bones, one or two of the hands being entire.

In the progress of removal, I found the eastern or small part of the mound to be literally filled with graves. The modes of burial had been various; the depth of remains varying from two to nine feet; while there was a difference of posture in nearly every skeleton. I found that that not less than ten or twelve dogs had also been buried; the human and canine side by side. One group of nine graves I was so impressed with, I will endeavor to be particularly explicit. The first had two skeletons, that of a male and female, side by side, there not being more than four inches of sand between them. Both

* The celt is eight inches long, and the blue slate stone two and three-fourths. It is of a common form flat, with two tapering holes near the middle.

had evidently been buried in one grave. The female was buried on her knees, both hands spread over the face, which was downwards, and a string of conch shell beads around her neck. I found inside of her ribs the remains of a fœtus. Her partner was buried horizontal, with face down; both h nds had been placed with their palms on the face, their heads toward the east. After tracing the bones with particular reference to their positions, and to save these skeletons which were best preserved, I took down the disturbed strata with my hands; and at the head of the grave I found above the remains, and pointing down, the bones of the index finger, while at the foot of the grave, and at a corresponding height, the bones of a great toe, pointing in a similar manner. The balance of the group were buried some with face down, both hands over the face, others with one hand; some with face up, and both hands over the face; while another had one hand over the breast, the other over the face. All this group had the heads to the east. On one of this group, I found a string of copper beads, of which the metal had never been smelted, but evidently had been flaked from the native metal, and rolled around a twisted string, evidence of which was still visible in the beads, which were rude. On the north side of the eastern portion, under an oak tree stump (one hundred and fifty years old by growths), were the remains of the largest human bones I had ever seen. The joints of the vertebra seemed as large as those of a horse. I think they did not indicate a taller frame than some others; but the bones were heavier than any in the mound. I have its inferior maxillary broken, but glued together, in my cabinet. The other bones were so decomposed that they were useless. I could not say as to his posture, as the stump brought down the grave, rendering it out of the question to note the position. Near the last named skeleton, perhaps ten feet from it, we came upon a grave that had been dug oblong almost six feet deep, three feet wide, and over seven feet long, which they had filled with human bones promiscuously, without regard to order, to the depth of four feet; on these, in regular order, were placed twenty-seven skulls, with the top of skulls up. They were about two feet below the surface; the bones so much broken, and I regret to say I did not examine them as particular as I should have done. One of the skulls had a small hole broken in, and I learned afterward that a piece of the femur was found where they were dumped on the road having a flint dart fast in the bone. There was an implement or ornament found having one part like the head of a bird's neck, and shoulders like a horse, cut off back of the shoulders, and turned up like the back part of a saddle seat; the lower part being flat, with a hole drilled diagonally from the lower part of the neck to the base, with a corresponding hole in the back part. This implement was manufactured of a blue stone resembling slate, but extremely hard.* It is probable they had had a battle, and after the flesh had decomposed, they collected the bones and brought them to the mound for burial. I am sure from the positions of the bones, they had not been interred with the flesh on. I found in this part of the mound the remains of at least fifty children, under the age of eight years, some with two, others with four incisors; some with eight, and others with no teeth. On the neck of one infant having two incisors, there was a string of conch shell beads of the largest size, one hundred and forty in number; four of these beads were black, and were about three-fourths of an inch in diameter. The string would weigh one pound or more. Some of the graves had trinkets and beads made of clam shell; some had bones of the deer, sharp-pointed, others had pieces of deer horns; some had long-shaped beads around the

* This is the saddle-shaped stone figured on page 239 of Squier and Davis' "Monuments of the Mississippi Valley." It is either an ornament or a badge, which was suspended, and is frequently found on the rface.

ANCIENT MOUNDS

TWO MILES EAST OF MIAMISBURG MONTGOMERY CO. OHIO.

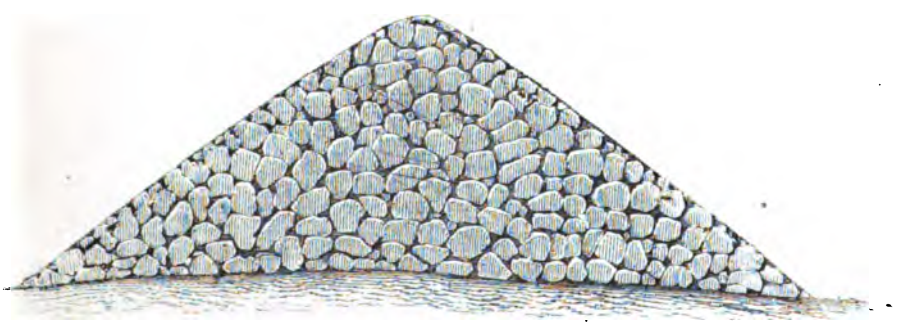
65 Feet High, Diameter of Base 263 Feet

Photo for the Western Reserve and Northern Ohio Historical Society by J. Slater, 1872.

TIPPETS MOUND LICKING CO. OHIO.

Height 24 ft. Diameter of Base 80 ft.

Sketch by D. Wyrick 1860.



MOUND OF LOOSE STONES 1½ MILES S.E OF JACKTOWN LICKING CO. O.

Height About 30 ft. Diameter of Base 170 ft.

Profile. Restored by Chas. Whittlesey 1838.

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wrists, I think of ivory. One had a conch shell plate (Plate XII, Fig. C), round, about five inches in diameter, with a hole in the center, half an inch in diameter, with two holes near the edge, for suspension with a string from the neck, like a breast-plate. Some had birds buried with them. One skeleton taken out of this part of the mound had the appearance of a very aged man; the point of the inferior maxillary was almost in two parts, while the trachea was bone all around. Quite a number showed indications of extreme age; seven or eight that I observed had bone tracheas.

I now return to the western or larger portion of the mound. This part was removed as fast as the former. I soon discovered there were two rows of graves, leading direct from the *two first mentioned*, containing the flint implements, paint, etc., towards the center, each pair having been dug deeper as they approached the center of the mound. Those with the stone axe, paint, and flint implements were four feet deep, the depth of each pair increasing about a foot in regular gradation till the last pair, which was as near the center and highest point of the mound as I could calculate, the last pair being *eighteen feet* below the surface. The pair next to those with the axe, paint and flint implements were in a sitting posture, as were all in these two files except the first two. On the head of one of the second pair was a conch shell plate (Plate XII, Fig. A), resembling in shape the sole of a moccasin, nine inches in length and three and a half inches greatest breadth. This plate has three holes in it towards the wider end, and it was placed on the top of the head, with the larger end back. Two other skeletons of these two files had similar plates (Plate XII, Fig. B), differing only in size, the smaller being about half the size of the larger. Several implements of stone were found, all differing in shape. They were of stone resembling slate, but much harder. One of them is three inches long by one and a half broad, in form of a shield, with two holes through it flatwise. Farmers picked up some implements in the field adjoining the mound. One given me by Judge Baldwin is a flat stone of slate, with one transverse hole, that I supposed belonged to the same race. As we approached the center of the mound, the graves getting deeper, the bones were much better preserved. Several bodies in decomposition had formed a cement that would have preserved them an almost incalculable length of time. In fact, when first taken out of the cement they had the appearance of bones just dissected, being nearly one-third heavier than those without cement. The four last deepest skeletons *all* had beads on, some of them quite small, the smallest not as large as a pea. Some were made of clam shells, but mostly of conch or sea shells. Those of clam were so decomposed that they fell to pieces. Three of these skeletons had beads only around the neck, the fourth, being the last one taken out, and the file leader (as he ought to be called) of the two deepest, had, I should think, nearly thirty yards of beads, having four wraps around the neck crossed over the breast and back, passing down between his legs; strings down his legs to the feet; also strings along his arms and around his wrists. This remains presented the appearance of being decorated all over. He had no other ornaments or implements that I could find. Near the south side of the western part of the mound, near one of the forest trees, I found the remains of a human being that seemed to be detached from all the rest. I thought perhaps he was an Indian of some of the late tribes, who had been buried perhaps on some hunting expedition. There was a piece of deer horn with him that had the appearance of having been the handle of a butcher knife. I could not detect any evidence of rust, however.

On the highest part of the mound, and about twelve or fifteen feet from the two deepest graves, was evidence of fire. The loam had been burned till it had a brick color. I have seen it look very much so where a large log heap had been burned, and would have thought such was the cause, had it not been that it was below the surface about three

feet. The whole number of skeletons exhumed by me was *three hundred and eight.* I could not ascertain how many had been taken out by diggers of sand. The citizens of the vicinity informed me that there was a very heavy forest on the mound at the time of clearing it. They also stated that the Indians who were there with the first settlers knew nothing of the race who interred their dead there. I have very little doubt they belonged to the age of stone. There was no evidence that they ever had any communication with the age of iron or bronze. They must have had some commercial arrangements for getting conch shells and copper. The copper has the appearance of the Lake Superior copper, and the conch shells must have come from the Atlantic, Pacific, or Gulf of Mexico. There was no evidence of pottery that I was able to discover. I have visited as many as twenty in the Mississippi Valley, on nearly every one of which were pieces of broken pottery, literally covering the mounds. East of Vicksburg, near Black River, we turned a mound into a redoubt. In excavating, there were layers of charcoal of about two inches in depth in the mound. I found a small stone ax or celt, also a stone shaped like the knob of a bureau. There was a circle hollowed out in the center of the raised part; within the circle was a depression as if the stone had been turned in a lathe on a pivot. This mound was small in area, and not over six feet high. In a south-west direction, and not further than twelve rods, was a smaller mound four feet in height, and south-east from this was a large belt of gravel in the shape of a horse shoe, that had been strewn with shells in sufficient quantities to whiten the ground. About a mile from this, in a north-east direction, across Clear Creek, I visited a mound on which the plough had turned up human bones. But I will not weary you further with Mississippi mounds.

About three-fourths of a mile from where I now reside, on a farm owned by a Mr. Stump, is a very beautiful little mound about thirty feet across and six feet high. Some years ago Dr. Craig, of Ontario, Richland county, made an excavation in which he discovered charcoal, ashes, and a flint knife five inches long. It is my impression that no signs of human bones were discovered by him. There has been a large number of stone axes (or celts) of all sizes between two and seven inches in length found on the surface, some of them finely made, mostly of granite. Various other implements have from time to time been picked up, and I have made a practice of preserving the flint implements on my farm and vicinity, until I have over two hundred specimens of various shapes and sizes.

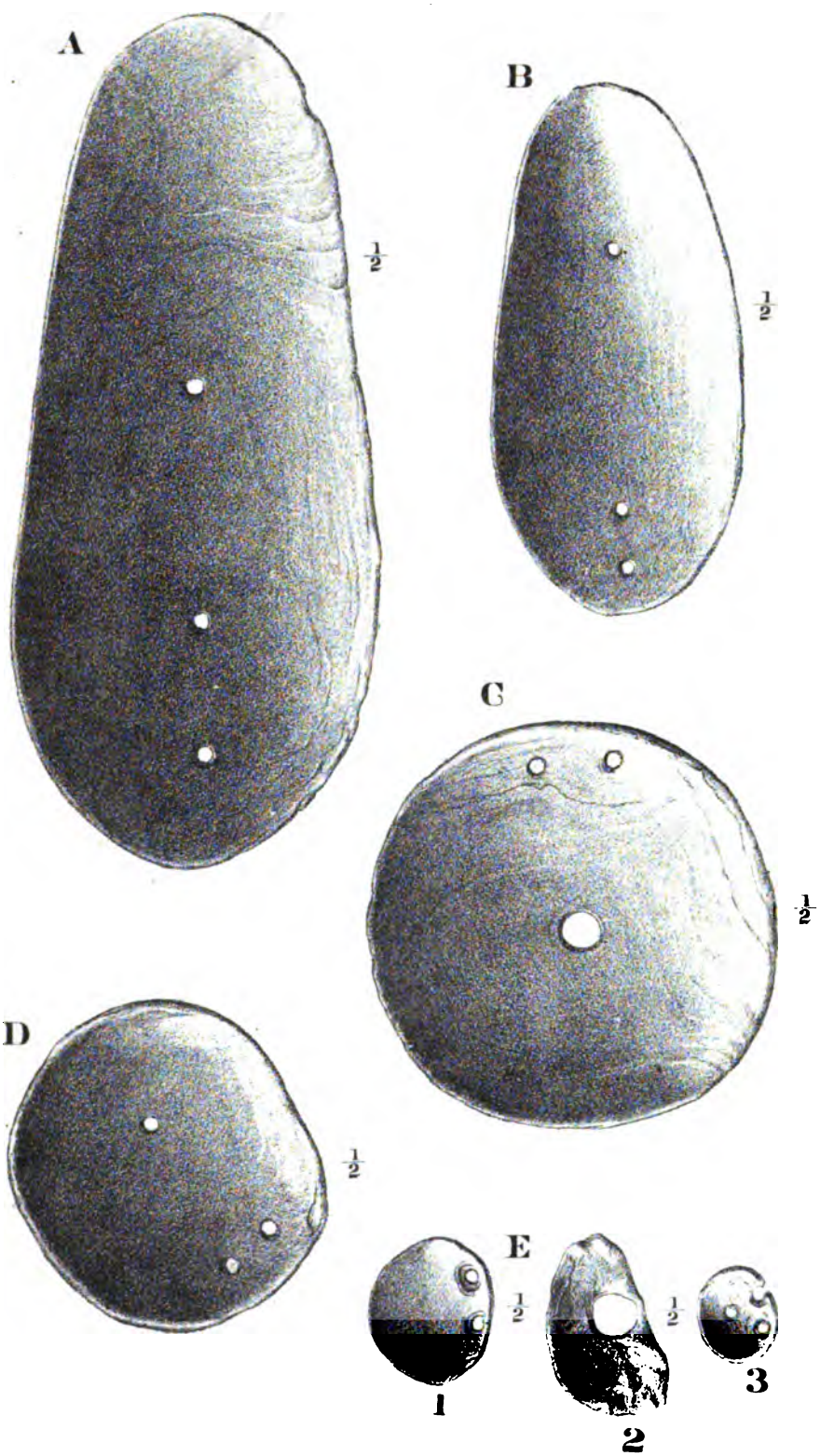
Another mound in Shelby county lies about a mile north of Sidney, north of the Blue Cut, as it is called on the railroad. This mound seems to me to indicate that it had been made by carrying gravel from Mosquito Creek, which is near it. It is long-shaped, and, as near as I can judge, about eight or ten feet high. I had a desire to excavate it, but had no opportunity.

JOHN S. B. MATSON.

The articles found, and the leading features of the burials, which Mr. Matson has so thoroughly described, are principally Indian. Adair, a century since, saw the Creeks of Central Georgia wearing oval plates on their heads and breasts, made from large shells. The stone chisel, the ornamental stones, and the arrow points are Indian relics, but it is very rare to find copper in the graves of recent red men. Evidently the mound had been trimmed, rounded and raised, since the bodies of the central part were deposited.

The large number of bones, of which Mr. Matson speaks, not buried

HEAD & BREAST PLATES



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with the flesh on, forms, no doubt, one of those ossuaries which the early Jesuits saw the Hurons make on the shores of the Georgian Bay. Every few years they exhumed the remains of their dead relatives, and bore them to a central point, where a funeral feast was held, and the collection tumbled into a pit, amid the most dismal cries of grief. In the ancient burial mounds no bones of domestic animals have been found. In this a number of dogs were buried with their masters. With the Indians it is, and has been, not only a common, but an almost universal rule, to place with the dead body a good supply of food. The dog is not only his choicest meat, but his dearest companion. This mound presents features not fully consistent with the sepulture of the red man, or of the mound-builders, but the predominant ones are characteristic of the Indian of our day. If all the circumstances surrounding each skeleton could have been determined, the two races could probably have been separated.

CHAPTER VI.

Kettles, Bottles, and Vases.

A large part of the pottery found north of the Ohio River indicates a practical purpose for domestic uses. The material is generally pounded fresh-water shells and loam. Whether the kettle was baked before it came into use as a boiler is doubtful. Kettles and pans are not hard burnt, and show no signs of glazing. Their form is various, and not very well proportioned. Most of them have a rim bent over outwards around the top from the upper edge, gathered somewhat below the rim, with a bilge lower down.

Sometimes there are projections near the top, which answered equally as well to support a cord or withe for suspension over a fire. They could be heated on coals or a wood fire, without suspension, especially where they are pan-like, with a broad, flat bottom. They could also be used as pails and as drinking-cups or basins.

Vases and urns are made in more elegant proportions, more highly finished, generally without the pounded shells, and more thoroughly burned. Many of them are painted red with iron ochre, which resists age and moisture very well.

In Plate XIV, three of the kettle-form pots are represented on a scale of one-half nature. A is from a mound which once existed on the site of the penitentiary, Columbus, Ohio, at the confluence of the Olentangy and Scioto rivers. It has, besides the rim, four knobs in the compressed groove below the rim, a feature not unusual in this kind of ancient pottery. The original is in the collection of the State Library. B is in the cabinet of the Western Reserve Historical Society, presented by

F. A. Gage, Esq., of Lawrenceburg, Indiana. He represents it as having been found in a mound at that place. C is from a mound near the Mississippi River, not far from Memphis, Tennessee.

Among the exhibits at Philadelphia, there was one from the collection of the Fire Land Historical Society, Norwalk, Ohio, about the size of C, but with a wide mouth nearly the size of the kettle. There are on the outside very plain lines or grooves up and down, like the prints of grass. Such pottery is known to have been fashioned by our Indians, in a grass basket as a mold. After drying in this mold it is ready for use. The bottom of this one is convex, and not flat. A photograph is among the State Society's collection. Another, quite similar in style, size, and markings, has been sent to the Western Reserve Historical Society by Dr. Myron Tompkins, of Silver Island, north shore of Lake Superior, Ontario. It was exhumed by him from a grave on the main land, opposite the islet. The grave is on one of the ancient sand-beaches of the Lake, fifteen feet above the present level, was circular, about two and a half feet across, and the same in depth. It appears that the skeleton was that of a woman, buried sitting, with the kettle between the knees. In it were two triangular flint arrow-points, or cutters. Two polished copper daggers were found on the surface near the grave. Among the bones outside of the kettle was some ochery and adipose matter that may have been paint.

The similarity, amounting almost to identity, between earthen kettles from Southern mounds, and from the graves of Northern Indians, is another evidence of a close relation between the mound-builders and the modern red man. In the cabinet of the Western Reserve Historical Society are several bottles, kettles, and vases from mounds around Memphis, contributed by Col. De Pre. They are more highly finished than those I have just described, and more perfect in form. Some of them are colored with a bright ochre, which has not suffered by the exposure of ages. Mr. J. S. B. Matson, of Shelby, Ohio, found in the Hardin county, Ohio, mound about a teacupful of very fine ochre, which was so brilliant in color that I suspected it contained cinnebar. On testing it with acids it showed no metal but iron. About the same time, some ochre was brought me from the iron regions of the upper Menominee River, in Wisconsin After pulverizing, it could not be distinguished from that sent by Mr. Matson.

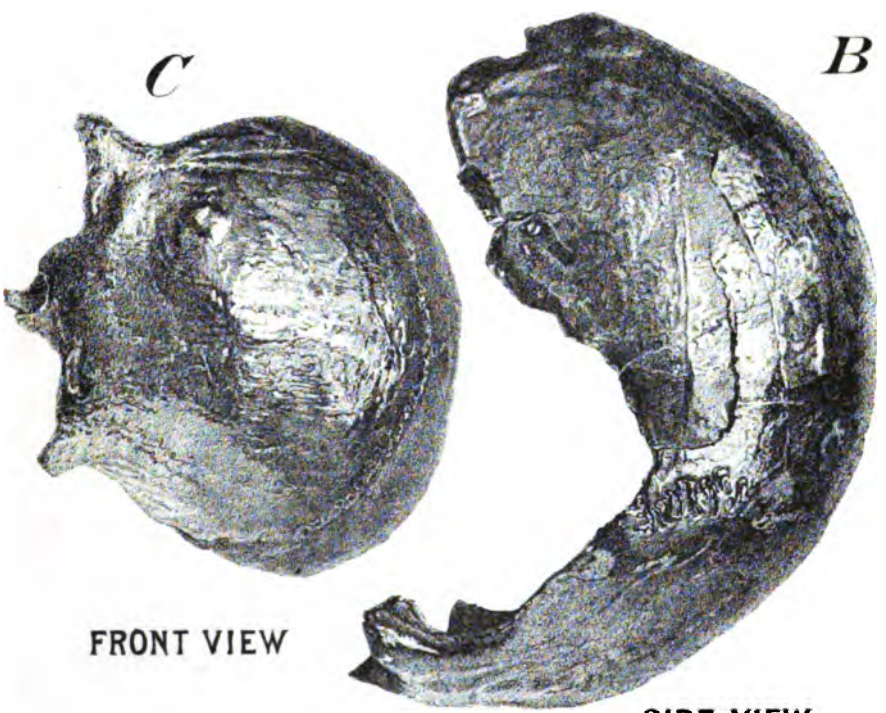
The fine gray and green-striped slate of which most of the polished ornaments to which I have referred is made, is also found on the Menominee, as a prevailing rock. Many of the ornaments in the Ohio collection are of iron ore, most of which is specular, and was brought from the Marquette region by the ancient tribes. They also worked cop-

SCULL FROM THE TIPPET MOUND

½ Nature

DOWNWARD VIEW

A



C

B

FRONT VIEW

SIDE VIEW

per mines on Lake Superior. It is probable that they discovered and worked the large ochre beds of the Menominee region. None of the hematites of the Coal Series in Ohio can produce an article equal to that on the Southern pottery and in the Hardin mound.

Among the water-carriers, vases, bottles, etc., brought by Mr. Fogg, for the museum of the Western Reserve Historical Society, from the Valley of the Euphrates, is one almost exactly like those here figured. In Hindostan the people use small brass kettles, of nearly the same pattern, to cook their rice. I have seen one considerably smaller than any of those from the mounds.

Human Effigies.

The grotesque forms and faces shown on Plate XV, are introduced to show a remarkable uniformity of type in places quite far asunder. This type has very close relations to the Peruvian. Figure A is size of nature from a cast in the possession of Mr. Gates, of Columbus. The original is in coarse sandstone, found in Westmoreland county, Pa. It is somewhat marred by the nose of the plow by which it was turned up in the soil. Over the skull is the head of a serpent, the mouth is open and the eyes closed like a dead person. The bunch on the back of the head is probably an example of the style in which the females of her era wore their hair.

B is a good profile of a limestone image plowed up in a cotton field near the base of the great Etowa Mound, five miles below Cartersville, Georgia. A small image was found near it. The material is limestone, the facial expression a repetition of Figure A. On the back of the neck is a handle *a*, that is certainly not ornamental. Figure C is a pipe in the collection of H. H. Hill, of Cincinnati, reduced one half. The bowl is at *a*. On the head and over I, there is considerable obscure ornamentation. This, and perhaps all of the above described effigies, are modern and the work of red men. A single instance of similarity to the Peruvian profile would be nothing remarkable. Here are three from widely different regions having that peculiarity, and all from the surface.

It may also be said that very few of the recently made effigy-pipes of the northern tribes, give a fair representation of the countenances of their race.

For ethnological purposes it is possible these effigies have been received with too much liberality and confidence. I offer them to call attention to this department of our relics.

Spindle Whorls and Sockets.

There are no people, however barbarous, who have not some process for making cord or thread. They utilize their materials, varying according to climate and its vegetable productions.

The northern tribes use the fibrous bark of trees, the fibrous coating of the nettle, milk-weed, and wild hemp. In warmer climates they have wool, flax, cotton, and silk. Something answering the purpose of a balance or whorl to the primitive spindle is found in all countries. It is generally of stone, circular and flat, with a hole in the center, in which the spindle is inserted. It has been suggested that many of the so-called discs and rolling stones, profusely scattered over the surface, are spindle balances.

Spinning and twisting, in ancient times, was done by hand, as it has been in several countries within one hundred years. Sometimes the roll of flax, bark, wool, cotton, or tow is held in one hand, and the spindle in the other, twirled by the fingers.

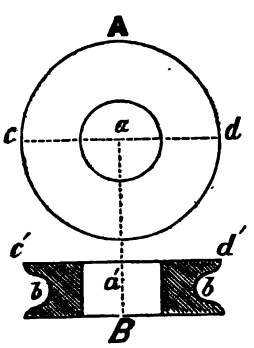
Mr. Evans relates an instance where a Scotch woman, in the Highlands, was found making yarn in that way, with a potatoe for a balance-wheel, through which the spindle was thrust.

In northern Mexico the Spaniards found the natives spinning cotton on a wooden stick, tapering to a point at the top, the large end of which was set in a bowl.

The wild Arabs made cloth of camels' hair, by methods nearly as simple. In India and in ancient Egypt, cloth was made of linen and cotton in this way, the fineness of which has not yet been attained by machinery.

A number of perforated stones are found in Ohio, which come nearer to the purpose of balance-wheels than any thing else. The one here figured A, B, was taken from a mound in Licking county, Ohio, by Dr. J. N. Wilson:

FIGURE XIX.—SPINDLE WHORL OR BALANCE—½ NATURE.



A—horizontal projection.
B—section on *c*, *d*.
a, *a*—central bore.
b, *b*—groove.

It is grooved on the rim, *b*, *b*, as though a cord or bow-string had been passed around it, to produce a revolving motion. This is the only case of an external groove that has come to my notice.

There are numerous irregular balls, perforated in such a manner that

KETTLES

A

½

B

½

C

½

W. J. MORGAN & CO. LITH. CLEVELAND.O

a wooden spindle may have been inserted. They may also have been suspended as ornaments, but only a few of them show signs of wear for such a purpose.

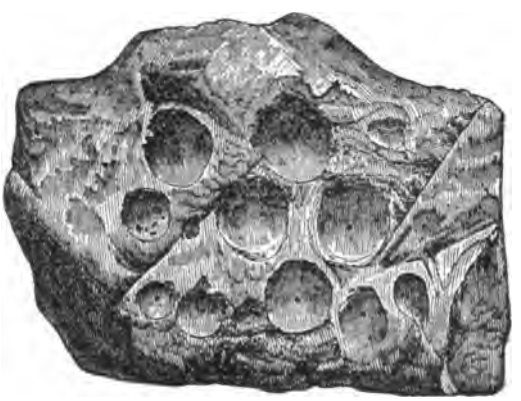
Mr. Hume, of Liverpool, England, in his "Archæology of Ulster," and of South America, has fully treated of this interesting branch of ancient industry. He saw, among the South American Indians, the process of making thread from the short fine wool of the llama. In the top of a small wooden spindle is a split, into which the end of a sort of roll, held in the left hand or by a girdle, is placed, and the spindle, with its stone balance at the bottom, is twisted by the right hand. When a short thread is twisted, it is wound around the top of the spindle by a reverse motion; then another one is started in the cleft, as before. By fastening the spindle at the top, above the cleft or splinter, and using a bow-string, a strong, regular, and rapid motion could be got up, on the plan used by the Iroquois to obtain fire by friction.

I conceive that the universal cup-shaped cavities, which are seen on small stones throughout the Ohio Valley, were formed by the lower ends of such spindles.

As the mound-builders had no domestic animals to furnish skins for covering, and for sacks or bags, and their numbers were too great, especially near large towns, to allow of wild animals, they must have made cloth of the fibre of trees or plants. Such coarse cloth, like coffee-bagging, is often found in mounds.

Thread-twisting and weaving must have been among them a great industry. The red man of the north clothed himself in skins. The remains of implements for making cloth must therefore belong to the mound-builders.

FIGURE XX.—SPINDLE FOOT RESTS—SANDSTONE—CUYAHOGA COUNTY, OHIO—¼ NATURE.



What is it?

Of this rare and, so far as I know, undescribed relic only three have come under my observation. The one here figured is a surface find near Orrville, Wayne county, Ohio. One somewhat similar, but larger, more slender, and less symmetrical, is in the cabinet of Peter Neff, Esq., Gambier, Ohio. Another, from Indiana, was exhibited in the subsection of archæology of the American Association at Detroit, August, 1875. All are made of grey, or greenish grey, striped silicious slate, well polished. None of them are stout enough to answer the purpose of a tool. Neither the form, or perforations indicate anything more than a badge or ornament.

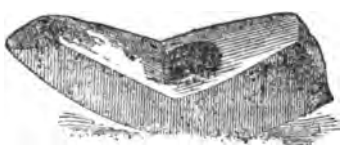


Fig. 21.
One-half nature.
Orrville, Wayne county, Ohio.

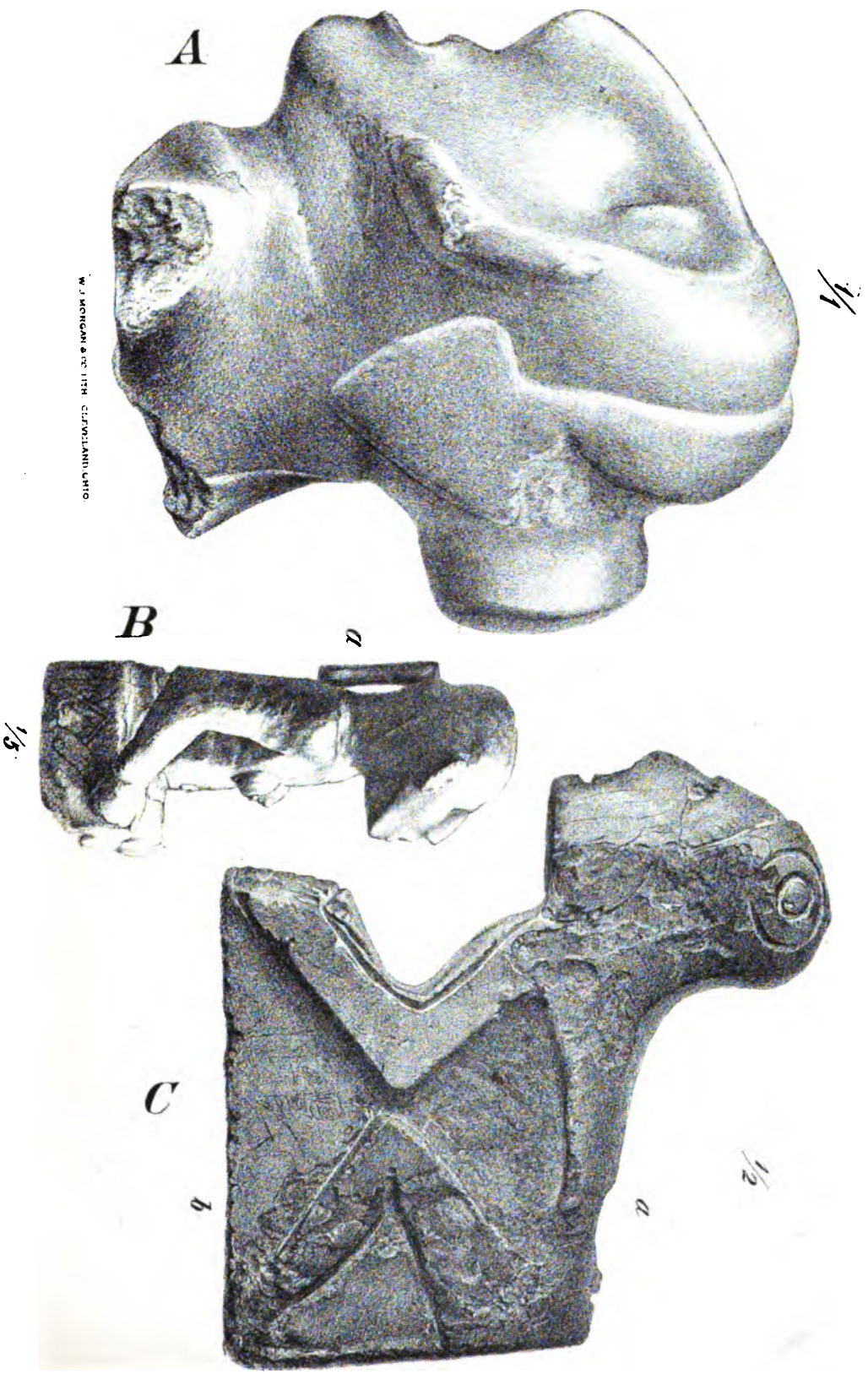
The bore is not circular, but elliptical, the longer axis up and down, and tapering toward the center. All are more or less prow-shaped along the lower edge, which is thin, with a groove on the upper edge, which is one-half inch thick. Where the upper part is cut away down to a level with the eye, there is also a longitudinal groove on the stem a little broader, but not in line with it. It may have been carried on a stick inserted in the bore, or in some other manner attached to the person as an insignia. It was evidently not common, but does not evince as high a rank in art as many other more elaborated badges. For want of a name that shall convey an idea of its form, I present it to antiquarians without one, hoping that it may be invented. The side or profile view is somewhat like a pipe with a short stem.

Somewhat analagous to this is another nondescript manufactured of polished green slate, nearly in the form and of the size of a plain linchpin. It was found on the surface in Warrensville, Cuyahoga county, Ohio, by Mr. Thorpe, and is now in the cabinet of the Western Reserve Historical Society. There is no perforation through the head, nor any part of the pin, nor any grooves. The lines and faces are straight, and the corners sharp. This is the only one of this form of which I have any knowledge. It has the appearance of a finished article. In its present state it could not be fastened or suspended. Its slender size and its form do not comport with those of any known implement of the prehistoric races.

Bowls of Porphyry.

I have seen only a fragment of one of these pieces of ancient art. The material is hornblende and feldspar, very hard and tough, and capable of

PLATE Nº 15.



a high polish. This fragment is in the cabinet of Dr. Burns, of Cincinnati. J. H. Devereux, Esq., of Cleveland, has seen several entire ones, in Tennessee, having a diameter of two to five inches, and a depth about one-half the diameter. The Burns fragment is from the rim of a dish, apparently three and one-half inches in diameter, a little thicker than our modern porcelain bowls. The proportions and finish are as elegant as any thing of modern date. In shape it resembles a deep saucer, perfectly circular, the curves swelling out gracefully on the bilge. Mr. Devereux says of those found in Tennessee, between the rim and the center they are sometimes so thin as to be translucent, as though they had been worn thinner by a stirring process. The cavity must have been formed by turning, and the exterior wrought down by patient rubbing to a uniform thickness.

CHAPTER VII.

Location of Ancient Earth-works in Ohio.

Works of the first class are indicated in the margin by a star, thus *; of the second class, thus †; of the third class, thus ‡.

Valley of the Great and Little Miami Rivers.

Butler County.

1. ‡ Ross township, Sec. 27, T. 3, R. 2.
2. † Fairfield township, Sec. 8, T. 1, R. 2.
3. ‡ Pleasant Run township, Sec. 10, T. 1, R. 2.
4. † Ross township, Secs. 12 and 3, T. 3, R. 2.
5. ‡ St. Clair township, Secs. 4 and 5, T. 3, R. 2.
6. ‡ Fairfield township, left bank Great Miami.
7. ‡ " " Sec. 15, T. 1, R. 2.
8. * Near Hamilton.
9. * Two miles north of Hamilton.
10. ‡ One mile north of south line of county, on the river.
11. ‡ One mile east of No. 10.
12. ‡ One mile north of Great Miami; two miles above Pleasant Run.
13. ‡ Fort, three miles south of Hamilton.
14. ‡ Fort, six miles south-west of Hamilton.
15. ‡ Five miles north of Hamilton, on Seven-Mile Creek.
16. ‡ Fort, near Oxford.
17. ‡ Fort, west bank Great Miami, four miles south-west of Hamilton.
18. ‡ Fort Somerville, Secs. 3 and 10, T. 5, R. 2.
19. ‡ Fort, nine miles north of Hamilton, on Nine-Mile Creek.
20. ‡ South-west corner of county, Sec. 14, T. 3, R. 2.

Hamilton County.

1. * Large earth-work, Cincinnati, now obliterated.
2. * North Bend; a large fort.
3. * Colerain township, east bank of Great Miami.

Montgomery County.

1. * Three miles south of Dayton, east bank Great Miami.
2. * Alexandersville.
3. ‡ Miamisburg, large mound, 65 ft. high.

Miami County.

1. ‡ Stone circle, near Piqua.

Warren County.

1. * Fort Ancient.
2. * Two miles below Warren, east bank of Little Miami.

Clermont County.

1. * Milford, on Little Miami.
2. * Newtown, on Little Miami, left bank, three miles up stream.

Preble County.

1. ‡ Fort, six miles south-east of Eaton.

Greene County.

1. ‡ Seven miles east of Xenia, Sec. 24, T. 4, R. 8.
2. ‡ Massie's Creek, west bank Little Miami.

Valley of the Scioto River.

1. * Portsmouth.
2. * On the Kentucky side of the Ohio River, three miles above Portsmouth.
3. * Kentucky side, opposite the mouth of the Scioto.
4. ‡ Pond Creek, west bank of Scioto; effigies.

Pike County.

1. * Three miles south of Piketon; graded way.
2. ‡ Seal township.

Ross County.

1. * Franklin township.
2. * Big Bottom canal.
3. * Chillicothe.
4. * Twelve miles north of Chillicothe.
5. ‡ Alderson's.
6. ‡ Kilgore's Mill.
7. ‡ Three miles south of Chillicothe, Sec. 18, T. 9, R. 22.
8. ‡ One mile north of Hopeton.
9. * Near Bourneville, on Paint Creek.
10. * Near Frankfort, one mile east.

11. * One mile south of Bourneville.
12. ‡ Stone fort, one and a half miles south of Bourneville.
13. ‡ Harp-shaped work, two and a half miles south-east of Bourneville.
14. ‡ Five miles north of Chillicothe.
15. ‡ Hopeton.
16. † East bank of Scioto, opposite No. 15.
17. * Mound City, three miles north of Chillicothe.
18. ‡ Liberty township, south-east of Chillicothe.
19. ‡ Two miles south-west of Chillicothe.
20. ‡ Fifteen miles west of Chillicothe.
21. ‡ Bainbridge.
22. ‡ Stone circle, two miles west of No. 12.

Pickaway County.

1. * Circleville; principally obliterated.
2. ‡ Near Tarleton.
3. ‡ South line of county, on the Scioto.
4. ‡ North line of county; west bank of Scioto.

Franklin County.

1. ‡ One mile west of Worthington.
2. ‡ Three miles south-west of Columbus.
3. ‡ Four and a half miles north of Worthington.

WATERS OF LAKE ERIE.

Ashtabula County.

1. ‡ Fort on Conneaut Creek, three miles south-west of Conneaut.

Lake County.

1. ‡ Fort, three miles east of Painesville, on Grand River.

Cuyahoga County.

1. ‡ Fort; lot 313, Newburg, near Cleveland.
2. ‡ Fort; right bank of Cuyahoga; south line of Newburg township.
3. ‡ Fort; left bank of river, near center of Independence.
4. ‡ Fort; right bank, mouth of Tinkers Creek, south side.
5. ‡ Forks of Rocky River, below Berea. Ten small mounds in the valley of the Cuyahoga, the largest eighteen feet high.

Summit County.

1. ‡ Fort; lot 79, Northfield; right bank of Cuyahoga.
2. ‡ Fort; Boston, right bank, two miles south of Peninsula.
3. ‡ Fort and caches, both sides of the river, near the line between Boston and North Hampton.

Medina County.

1. ‡ Fort; Rocky River, Weymouth.
2. ‡ Circle, half mile east of Granger.
3. ‡ Canal, half mile west of Medina Centre.

Lorain County.

1. ‡ Fort; east bank of Black River, two and a half miles from Lake Erie.
2. ‡ Fort; east bank, at French Creek, Sheffield township.
3. ‡ Fort; east bank of Vermillion River, Brownhelm township.

Huron County.

1. ‡ Three inclosures at the Forks of Huron River, two miles west of Norwalk.

Erie County.

1. ‡ Stone fort; Danbury township, near Lake shore.
2. ‡ Fort; Kelly's Island, south side, near the landing.

Lucas County.

1. ‡ Inclosure, south bank of Maumee, two miles above Toledo.

WATERS OF MUSKINGUM, HOCKING, AND OTHER RIVERS.

Licking County.

1. * Near Newark; a very large and complicated work, with several forts on the adjacent hills.
2. ‡ Two miles east of Jackson, a small inclosure and stone mound.
3. ‡ Granville, one and a half miles east, effigy of an animal called "The Alligator."
4. ‡ Granville, two miles east. Fort.
5. ‡ Granville, one mile south. Fort.
6. ‡ Jackson, two miles east. Fort.
7. ‡ Fort, three miles south of Newark. In this county are a large number of mounds, five to forty feet high.

Richland County.

1. † Near Mansfield.

Washington County.

1. * Marietta.
2. ‡ Cats Creek, east bank of Muskingum.
3. ‡ Lowell, on Muskingum River.
4. ‡ Adams township.
5. ‡ Belpre.

Athens County.

1. ‡ Four miles north of Athens.

Adams County.

1. † Serpent effigy. Entry 1,014.

Highland County.

1. † Fort Hill.

Perry County.

1. † Stone fort, five miles north-west of Somerset.

Fairfield County.

1. ‡ Rock Hill.
2. † Three miles west of Lancaster.
3. † Several groups near the Hocking River.

Jackson County.

1. ‡ Near Jackson—two miles north—two small works.

Knox County.

1. † A group of forts near Frederickstown, recently surveyed by Rev. S. D. Peet.

PART III.

EDUCATIONAL.

OHIO EDUCATIONAL EXHIBIT AT THE CENTENNIAL EXHIBITION.

REPORT OF JOHN HANCOCK.

To the State Centennial Board:

GENTLEMEN—As one of the Commissioners appointed by the State Commissioner of Common Schools to assist him in taking charge of the Ohio Educational Exhibit at the Centennial Exhibition, at Philadelphia, I beg leave to submit for your information the following report:

As early as April, 1875, the Hon. C. S. Smart, School Commissioner, began to make arrangements to have the schools represented in the Centennial Exhibition at Philadelphia. In a letter dated the 26th of that month, and addressed to the Hon. F. W. Green, Secretary of the State Centennial Board, he proffered his services to that Board, in aid of a proper exhibition of the school interests of the State.

At a meeting of the Executive Committee of the Ohio Teachers' Association, and other prominent educators invited to meet the State Commissioner at Columbus, May 28th and 29th, for purposes of consultation, the Commissioner acting as chairman, the following, among other resolutions, were adopted:

1. That we believe that it is very important that there be a full and systematic representation of the educational interests of the country at the approaching Centennial Exposition at Philadelphia, and to this end a definite and uniform plan of procedure should be early perfected by the National Commissioner of Education as chairman.

2. That the Centennial should be improved as an important occasion for the preparation of a complete historical record of educational effort and progress in the United States, and that this work be undertaken by the National Bureau of Education, by each of the several States, by the cities and towns, and by all the higher institutions of learning, public and private.

3. That steps should at once be taken for the preparation of a history of educational progress in Ohio, and that a committee of five be appointed by the chairman of this meeting to present this subject to the Ohio Teachers' Association at its coming meeting,

and that the same committee be requested to submit plans and suggestions for the proper presentation of the educational interests of the State at Philadelphia.

4. That the State Commissioner of Common Schools is hereby requested to bring this subject to the attention of the colleges, and other higher educational institutions in Ohio, that provision may be made for the preparation of the same; also that he be requested to advise the school superintendents of the several cities to prepare their reports for the year 1874–75, with the special object of giving a full and clear statement of the condition of their schools for the use of the Centennial Exposition; also that he be further requested to secure proper persons to prepare a historical sketch of the school system of said cities for the same purpose.

The following gentlemen were appointed by the Commissioner under the third of the above resolutions: Superintendent A. T. Wiles, of Zanesville; Prof. T. C. Mendenhall, of Columbus; *Hon. E. E. White, of Columbus; President H. S. Thompson, of Otterbein University, and Superintendent John Hancock, of Dayton.

At the meeting of the Ohio Teachers' Association, held at Put-in-Bay June 29th and 30th and July 1st, plans for the exhibition of the school work of the State, were prepared and discussed in a special session held for the purpose; and on the last day of the meeting, Mr. Wiles, chairman of the committee appointed by the School Commissioner, presented a report, which was adopted, and of which the following are the most important features:

I. That the proper representation of the educational interests of the State at the Centennial should embrace—

1. A complete historical record of educational effort and progess in the State, including a general history of school legislation and progress, local histories of the rise and development of the graded school systems of the cities and towns of the State, and historical sketches of the colleges and higher institutions of learning.

2. Graphic illustrations of school statistics and progress.

3. Exhibitions of school work, including drawing and penmanship, and examination papers in the following branches: Arithmetic, English grammar, English composition, geography, natural science, music, and high school branches.

4. Models of school buildings, representing the primitive country school-house, the most approved country school-house of the present day, the city graded school-house, and the college building.

II. For the purpose of carrying out the plan of representation here submitted, the committee would recommend that the Association take the following action:

1. That, for the preparation of the historical record, one or more competent persons be selected by a committee appointed for that purpose, of which committee the State Commissioner shall be *ex-officio* chairman, and employed by the Association to take charge of this work, under the general direction of said committee. That the superintendents,

*On Mr. White's removal to Indiana to take the Presidency of Purdue University, Superintendent R. W. Stevenson, of Columbus, was appointed to take his place on the committee.

college representatives, and others preparing local histories, forward the same to the persons so selected for compilation.

2. That the prearation of the graphic illustrations be made under the direct supervision of the State School Commissioner.

3. That the examination papers be the actual, unassisted and uncorrected work of the pupils, the grades being designated by the number of the school year in which the work is done, and every member of each class be represented. That each set of papers be accompanied by the certificate of the superintendent or principal, as to the fact that the papers have been prepared in accordance with these conditions and the rules prescribed by the proper committee. That a committee be appointed by the State Commissioner, with himself as chairman, to make rules for the preparation of the examination papers, and to receive and approve the same.

III. The committee also recommend the adoption of the following resolutions:

1. That this Association approve the action of the meeting called by the State Commissioner in asking the State Centennial Board "to appoint a suitable person as Commissioner of Education, to attend the Exposition and take charge of all educational interests in connection therewith."

2. That we respectfully request the National Commissioner of Education to invite each of the other States to appoint a commissioner for the same purpose, said commissioners to form a National Commission, whose business it shall be to examine and report upon the Department of Education represented in the Exposition.

3. That the technical and professional schools, and the benevolent institutions of the State, in their educational aspects, be invited to coöperate with us in this exhibition.

4. That publishers of school-books, and manufacturers of school apparatus and furniture, be requested to present specimens of their publications and work for exhibition, and that authors of school-books not published in the State be also requested to furnish copies of said books for the same purpose.

On motion of the Hon. T. W. Harvey, the Committee which had just reported, was continued, with the State Commissioner as its Chairman, to carry out the purposes contemplated by the report just adopted by the Association.

In pursuance of the resolution adopted to raise a committee to take charge of that portion of the preparation for the Exposition relating to school work, the State Commissioner appointed the following gentlemen as his associates on that committee: Superintendent A. J. Rickoff, of Cleveland; President W. H. Scott, of Athens; Superintendent R. W. Stevenson, of Columbus; Superintendent W. W. Ross, of Fremont, and G. A. Carnahan, of Cincinnati.

The foregoing plan for an educational exhibit was elaborated by a committee of the National Educational Association (of which committee Superintendent Rickoff was chairman), and was adopted at the meeting of this distinguished body of educators at their meeting at Minneapolis in August, 1875. The plan and the rules for carrying it out were afterwards endorsed by the Bureau of Education, and were officially promulgated by the United States Commissioner of Education as a guide for those intend-

ing to participate in the Exhibition. The following are the most important of these rules and the directions accompanying them:

All material which may be offered for exhibition will be classified as follows:

I. Examination manuscripts prepared according to prescribed rules.

II. Special work for the preparation of which no rules are prescribed.

III. Material arranged and presented to illustrate systems of instruction.

Class I affords an opportunity for the public schools of towns and cities and separate institutions of learning of every grade to compare their own work with the work of others, performed under the like conditions.

Class II provides for the exhibition of anything that may be looked upon as of value in the line of educational products. Here no limit is prescribed in time or other conditions of preparation. As a condition of exhibition, however, it is required that the circumstances of the preparation be fully stated.

Class III opens the door for the exhibition of such products of the school-room as will serve to illustrate the working of a course of study or a system of instruction.

No contribution will be received in any one of the three classes for the purpose of competition.

Class I.—Examination Manuscripts.

Rule 1. None but *bona fide* pupils of the schools and of the particular grade of schools purporting to be represented shall be permitted to contribute anything for exhibiti .n in Class I.

Rule 2. All manuscripts to be exhibited in this class shall be prepared from the first to the fifteenth of February. Not more then four hours shall be allowed for the writing of a paper on any one branch of study, which time shall include the entire work from the time the questions are placed before the pupil to the completion of the copy submitted.

Rule 3. The ground or limit of the examination shall be the work done within the current school year up to the time of the examination and work preliminary thereto, according to the course of study of the institution or schools preparing the work, which course of study shall accompany all manuscripts sent for exhibition.

Rule 4. The questions for examination shall be prepared by the Superintendent of schools, or some other person not engaged in the instruction of the class or classes under examination, and the utmost care shall be taken that no information in regard to the nature or topics of the questions be circulated among the pupils, and that no intimation of the ground of examination, except as in Rule 3, be given to the teachers of the classes to be examined, previous the time of examination.

Rule 5. All schools, colleges, technical schools, special schools, and school systems of towns and cities exhibiting in Class I, may be represented, first, by papers prepared as above from one entire class of each grade in which pen and ink are used in writing; and, second, by not less than one paper in ten selected from all the other manuscripts prepared in the examination. [Note.—It is to be understood that when any grade of pupils, fifth year grade for example, is examined, all the pupils in that grade throughout the entire town or city system shall be examined, and that thereafter the manuscripts of some entire class of that grade is to be taken for exhibition, and also one-tenth of all the other manuscripts of that grade; and further, that the exhibition of manuscripts of entire classes and selected manuscripts shall be specially subject to the following rule:]

Rule 6. A title page for the papers of entire classes, and for selected papers, shall be inserted in every volume, collection, or set of manuscript designed for exhibition in class I, and no papers shall be admitted for exhibition in this class unless accompanied by a declaration from the principal executive officer of the school or other institution of learning thereby represented, that said papers were executed in accordance with the above rules and Rule 7, as below:

Rule 7. Every manuscript of every pupil or student should be headed in the pupils own hand writing, with his name, age, grade or class, the name of the school or institution of which his class is a part, and the date of the examination, and at the foot of the last page it should contain, also in the pupil's own hand writing, a minute of the time taken for the writing of the paper, which must include the whole time elapsing from putting of the questions before the pupil to the handing in of the copy exhibited. On the completion and handing in of any manuscript or specimen for exhibition under Class I, the student or pupil should make the following declaration on a separate slip of paper over his own signature, viz:

"This accompanying manuscript was written by myself, without aid from any source."

The manuscripts of every class shall be accompanied by a written declaration by the teacher, or from the one who had charge of the pupils of the class at the time of the examination, that the entire work of the class was done under his own eye, and that all the regulations were observed as therein prescribed.

It is not deemed necessary to set forth here the elaborate directions in regard to the preparation of the work in Classes II. and III.

It may be as well stated here as elsewhere that it is believed that the above rules were faithfully followed in almost every instance in the preparation of manuscripts to be exhibited from the schools of our State, though in some of the States these rules seemed to have received but little attention.

At a meeting of the Educational Centennial Committee of the State Teachers' Association, held at the State Commissioner's office, October 1 and 2, 1875, Hon. E. E. White and Hon. T. W. Harvey were selected as general editors of the "History of Education in Ohio," with power to select assistants to write up the several departments, subject to the approval of the committee. At this meeting arrangements were also made for the publication of the local historical sketches of schools and of the higher institutions of education. The selection of the writers of these sketches was committed to the Commissioner of Schools. It was decided that school authorities be requested to have their own printing done, and to send to the office of the Commissioner not less than five hundred copies of their respective sketches. It was further determined to address a letter to the State Board of Centennial Managers, asking pecuniary aid in the attempt to secure a respectable exhibition of the educational interests of Ohio. Mr. A. T. Wiles was appointed to correspond with school authorities in regard to models, photographs, and

plans of school buildings; and President Thompson was appointed to correspond with text-book publishers and manufacturers of school furniture and apparatus, with the purpose of procuring specimens for exhibition.

All the work up to this point had been done gratuitously, but with the hope that the State would step in at the proper time, and by a sufficient appropriation enable the educational department of the State to carry the arrangements inaugurated to a successful issue. The influence of the State Centennial Managers was freely given in procuring the necessary legislation, and the Legislature, by the passage of the following act, January 25, 1876, set at rest all fears in regard to the educational representation of the State in the great exhibition:

"Appropriation for the State Board of Centennial Managers: To pay the expenses of the State Board of Centennial Managers, thirty-three thousand dollars (and said board shall make no expenditure and contract no obligation in excess of the amount appropriated herein for its use), to be paid upon certificates drawn by the president of the board, under resolution thereof, upon the treasurer of the board, attested by the said treasurer and approved by the governor: Provided, that there shall be expended from the above sum not exceeding eight thousand dollars under direction of said board, for the preparation of a full exposition of the school system of Ohio, and a history of the benevolent, penal, and reformatory institutions of the State, as well as of similar institutions supported by counties or cities; and the State shall own all books bound or published from the proceeds of this appropriation and the manuscripts thereof, and shall have the sole right to apply for and dispose of the copy-rights of the same."

Much difficulty was experienced in obtaining room for the exhibition of educational products at Philadelphia. Our own School Commissioner, after much unsatisfactory correspondence on the subject, in the month of April visited Philadelphia in company with a member of his committee, to see what could be done by a personal interview with the Centennial authorities. He found the space which had been set apart for the educational exhibit of our own and most of the other States high up in a gallery on the south side of the Main Building, difficult of access, out of the ordinary route of visitors, and insufficient in quantity for any proper display of so important an interest. As no other space was to be had at that date, and it was too late to erect a special building for the purpose, as had been done by the State of Pennsylvania, the Commissioner felt compelled to accept what was offered, or abandon the idea of an educational exhibit altogether. Feeling that the latter alternative ought not to be adopted even in the face of the most discouraging circumstances, he chose the former.

In consequence of the shortness of the time that was to elapse between the time the appropriation was made by the Legislature and the time set for

the close of the examination, as well as the difficulty of informing school authorities of the design and method of representing their educational systems in the Exhibition, and the hesitancy of these authorities to assume what they feared would prove a considerable expense, the number of schools represented at Philadelphia was not so large as had been hoped. However, the representation was sufficiently extensive to give a fair notion of the work done in the schools of the cities and towns of the State. The exhibit was less showy than that of some of the other States, but as an exposition of solid, honest work, it is believed it would not suffer in comparison with any.

The three volumes of history prepared for the Centennial Exhibition are of much present value, and that value will constantly increase. They are not only history, but material for future histories. The two volumes of local sketches, especially, contain information which, in a few years, would have been lost beyond the recovery of the most painstaking research. It is to be regretted that these sketches were not more numerous. Many of the rural districts (none of which are represented) have a history as full of interest as the most favored towns. They have had teachers who subsequently gained a wide celebrity in their profession, and have sent out scholars who have enacted an honorable part in all the leading lines of human endeavor.

Some of the Eastern States have done much more in this direction than Ohio, and the sketches, which have evidently been prepared with great care, will be read with interest far beyond the bounds of the localities whose histories they give.

The sketches in the volume entitled "Education in Ohio," with two exceptions, were prepared by their respective authors without any compensation whatever. It will be readily seen that their preparation required much labor; and it is believed the facts they contain will be found in all cases entirely reliable. The editorial work on the volume was conscientiously done, and was in a great measure a labor of love and professional zeal. The interest taken in the contents of the volume by the general public has been manifested by the extraordinary demand for copies of the work from every quarter of the State—a demand far in excess of the supply.

The graphic charts, prepared under the direction of Prof. Mendenhall, were a unique feature of the Ohio exhibition, and this plan of presenting our educational statistics elicited much praise from visitors.

In general, the exhibit of Ohio received complimentary notice from the correspondents of the leading papers of the country, and from the

educational representatives of foreign governments; and it was certainly an exhibition of which our citizens have no reason to feel ashamed.

It was found by the School Commissioner impossible to secure the services of any one competent assistant who could spend at Philadelphia the entire time the exhibition was to remain open. Those whom he preferred for the office were actively engaged as educators, and could not leave their respective fields of labor for so long a period. The plan at first proposed was therefore changed, and four assistants were selected to take charge of the exhibit in turn with the School Commissioner, instead of one. These assistants were Prof. T. C. Mendenhall, and Superintendents A. J. Rickoff, John B. Peaslee, and John Hancock.

As has already been stated, it was a part of the plan adopted by the National Educational Association and the Bureau of Education that one representative or commissioner from each State should form a member of a general committee, which committee should divide itself up into sub-committees, whose work it should be to thoroughly examine the different features of the whole educational exhibit, as those features should develop themselves in the students' work, not only as to results, but as to methods of instruction and courses of study, and to make an elaborate report. For reasons not necessary to be mentioned, this design failed to be carried into execution. If it had been carried out, it is safe to say, from the character of the men serving on these commissions, such reports would have been produced as would have surpassed in value any that have ever been submitted to the public in any country. These reports would have enabled educators every where to compare the results of their work, and arrive at a conclusion, approximately at least, as to the relative value of their different courses of study, systems of school organization, and methods of instruction. Such a comparison could not fail by its suggestiveness to contribute to educational progress throughout the civilized world.

This general plan having failed, our Commissioner of Schools and his assistants resolved to carry it out in respect to the Ohio exhibit, taking within the scope of their investigations the exhibits from other States and countries. The results of their labors will doubtless be given in good time to the public.

It is to be regretted that the rules adopted for the preparation of students' work were not more closely observed throughout the country. It would have much facilitated the work of investigation and comparison at the exhibition. The individuality and independence of superintendents would, however, assert themselves, and all, except educational experts, found it difficult to come to a just conclusion as to the relative values of the work done under the various systems of schools represented.

Doubts were entertained by many as to the worth of an exhibit of students' work, and it was prophesied that so little interest would be taken in it that no one would ever look at the manuscripts after they were placed in the exhibition. But these evil prognostications were not fulfilled. No part of the exhibition attracted the attention of intelligent observers more. The number seen each day in the departments of the several States, poring over these manuscripts, was not a small one; and no educator could go through this work of the several cities and States with a critical eye, without learning that which might be made of immense practical value to him in his future professional labors.

The foreign display of maps, models, and other apparatus for illustrative teaching was far in advance of any thing of the like kind in the American exhibit. Germany, Russia, Sweden, Switzerland, and the Dominion of Canada were especially worthy of mention in this regard. It would, however, have added much to the value of the exhibits of these countries, if they had shown more students' work—most of them having done nothing at all in this direction. Even the little that was shown—if we may except this class of work in the Japanese and Swiss departments, and the industrial drawing in the Swedish—was of no considerable merit. Apparatus is doubtless of great value, but it can not work of itself; and one naturally wishes to see the results of its use. This there was no opportunity of doing in the foreign exhibit at Philadelphia.

It has been asserted that it is impossible to display the products of systems of education as we would display the products of agriculture and the mechanic and other arts; and yet it is believed most educators would unite in saying that it was not a difficult task to determine, by the inspection of the school work on exhibition, which was the work of well-ordered and well-taught schools, and which the work of schools of an opposite character. Careful, definite, systematic, and vigorous instruction could be read in every line of the manuscripts from some schools, whilst carelessness, indefiniteness, want of system, and lack of force could just as readily be read in the manuscripts from others.

It has never been contended that all the work of a school system could be displayed for inspection, but the great Exposition has conclusively proved that much of it can be, and has also furnished hints toward rendering the educational department of future exhibitions still more valuable.

In conclusion, I may be permitted to express the conviction that the Centennial year of our history will mark an epoch in American education.

Respectfully submitted,

JOHN HANCOCK,

Assistant Commissioner Ohio Educational Exhibit.

SCHOOL ARCHITECTURE.

REPORT OF ANDREW J. RICKOFF.

To the Board of Centennial Managers:

I herewith submit a report on school architecture, ventilation, etc., as illustrated at the Centennial Exhibition:

European nations far excelled us in the display of maps, charts, physical apparatus, models for drawing, illustrative casts, devices for the demonstration of the properties of numbers and of geometric forms, etc., etc., in fact in almost everything designed for use in the school-room, except in the one important particular, school desks and chairs. The results of the experience of the older countries, also, are very evident in the variety of their institutions of learning, being adapted as they are to the wants of every class of people, from the artist to the artizan. Not only are these institutions designed for the education of each one according to the general necessity of his class, but what is more, they are adapted to meet the special needs of each trade and profession, by providing particularly for instruction in those branches which are essential to its successful pursuit.

But when we turn to the school-house the contrast is greatly in our favor. As a result of the Exposition at Vienna, it was confessed that the apartments used for instruction in this country "were too collossal to be procured for European schools," and that our furniture was too expensive for their imitation. In the number and size of school buildings in proportion to our population, we are probably far in advance of any other nation represented at Philadelphia. The display of perspective drawings, photographs, and especially of well-constructed models, of American school buildings, was certainly unexcelled by that of any foreign nation. Every city and town, every collegiate corporation, that took any part in the exhibition at all, seemed to make this a principal point. So prominent was this feature of the exhibition that the future historian may be tempted to call this the "brick and mortar" age of American school enterprise.

School-House Plans.

Differences in organization, in systems of school management, in the relations of one department of a school to another, are the conditions

which, to a great degree, must determine the plans of school buildings. Hence the school-houses of Boston differ from those of New York, and there is, for the same reason, a wide difference between those of this country and of Europe. The history and development of school systems therefore bear upon this subject. For illustration we need only refer to the schools of New York as compared with those of Boston. The New York and Philadelphia public schools were, in their earlier days, managed upon the Lancasterian system.* The employment of a large number of pupil teachers or monitors made it necessary that their work should be done under the eye of the head master. This made very large school-rooms necessary. In the older New York school buildings some twenty years ago, the deep scoring of the floor in semicircles around the sides of the school rooms indicated, and perhaps in some cases still remain to show, where the small classes gathered around the monitor had to "toe the mark." As the schools gradually emerged from this organization, the teachers, yet in most cases quite young and inexperienced, still continued to give their instruction under the eye of the principal; but to avoid the noise and confusion, which must have been very great with twenty or thirty persons teaching simultaneously in one room, the houses were built with recitation rooms at the sides of the main assembly room, and by means of glazed doors the surveillance of the master was still possible. In some cases the assembly rooms were themselves subdivided by glazed partitions, a passage-way between them being still preserved, through which the head master could pass, and command a view of the work going on in every room. Hence the large assembly rooms, the very small recitation rooms, and the glazed partitions in many, if not all, the school-houses of the cities named. The plan of building is adapted to the school organization.

In Boston, and generally in the cities of the Western States, each teacher has his own school-room, of which he has to take charge in government as well as in instruction. How different the floor plans of the buildings in the two cases must be is evident, yet the mistake is frequently made of erecting a house wholly unsuited to the organization of a school, simply because some one in authority has seen a school-house somewhere the exterior of which has happened to strike his fancy.

Though the plans of school buildings of one part of the country may not be adapted to the schools of another, for the reason which we have mentioned, there are points common to all, as, for instance, provisions for

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* This system was attempted in Boston, but was not so long-lived as to produce any permanent effect upon the organization of her schools.

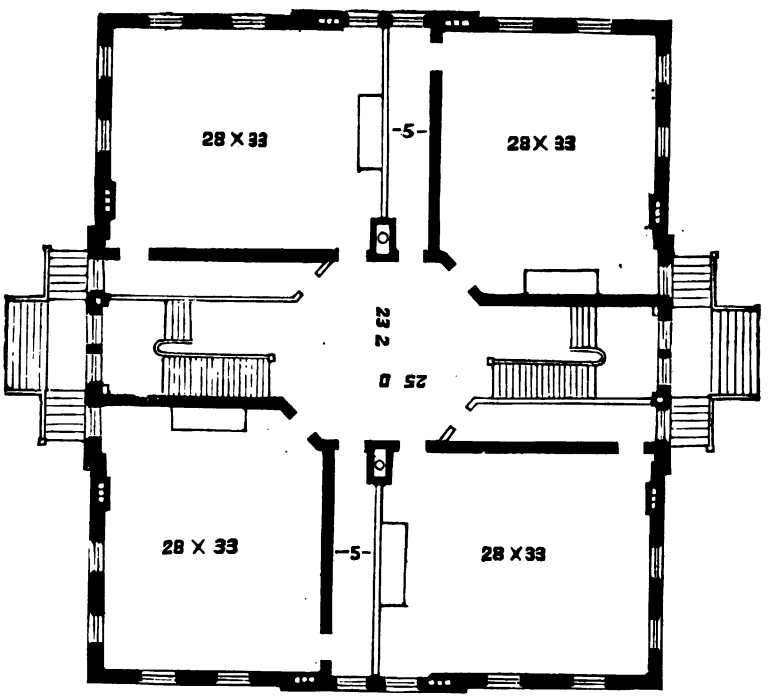
lighting, warming, ventilating, provisions for the security of pupils in cases of danger or panic, convenience of one kind or another, as, for instance, black-boards, cloak-rooms, water-closets, etc., etc., in regard to which the experience of each city or town would be of advantage to others.

It is to be regretted, therefore, that the different cities and States gave themselves almost exclusively to the display of the photographic views, etc., of the buildings, and that very few were so thoughtful as to bring out those features of school-houses and the appurtenances thereto which must always be serious problems to school men. In this respect architects were freely represented, the practical managers of schools scarcely claimed any attention. The thought of the latter was hidden from view by the display of the former. Even the models of the school-houses were defective; in that they did not expose for ready and convenient inspection the internal arrangements for the accommodation of pupils and teachers. Of all the models which we saw, one from the Dominion of Canada was, in all respects, the best for practical use. It was a model of a school building complete from the ground to the middle of the first story. The entire arrangement of the first floor was thus exposed to view. There were very fine models from European States, in some of which the practical adaptations were brought to view.

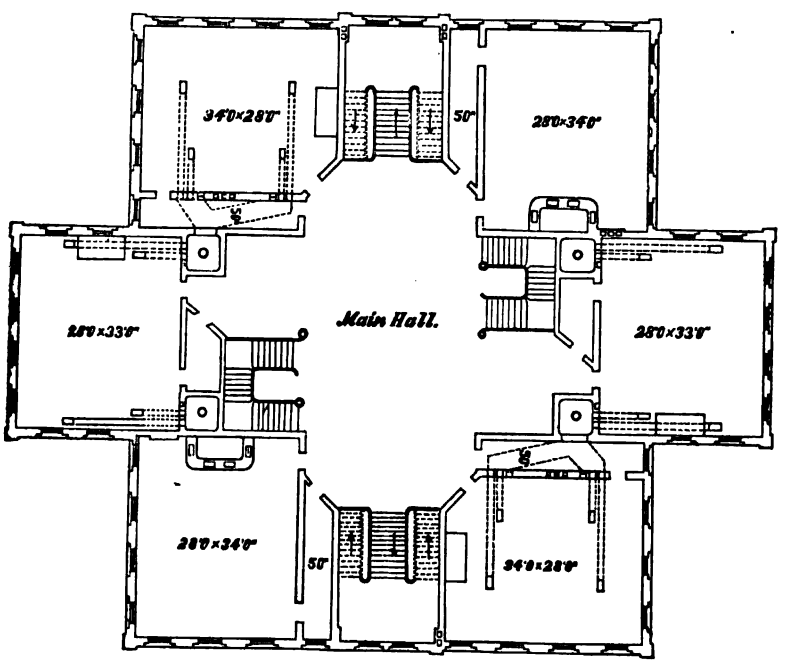
Two plans for school buildings which were exhibited by the city of Cleveland secured a special award. A description of the distinguishing features of these plans will have at least the advantage of directing attention to a matter of no little importance to boards of education and school men generally.

Two plans were exhibited, one of a school-house containing twelve class rooms with one recitation room, and the other containing eighteen class with two recitation rooms. Each building has a well lighted basement, nine feet high, rising in the clear four feet above the surface of the ground. The basement rooms are well paved and afford convenient and pleasant play rooms in stormy weather. In the winter they are kept warm by the boilers used for warming the building.

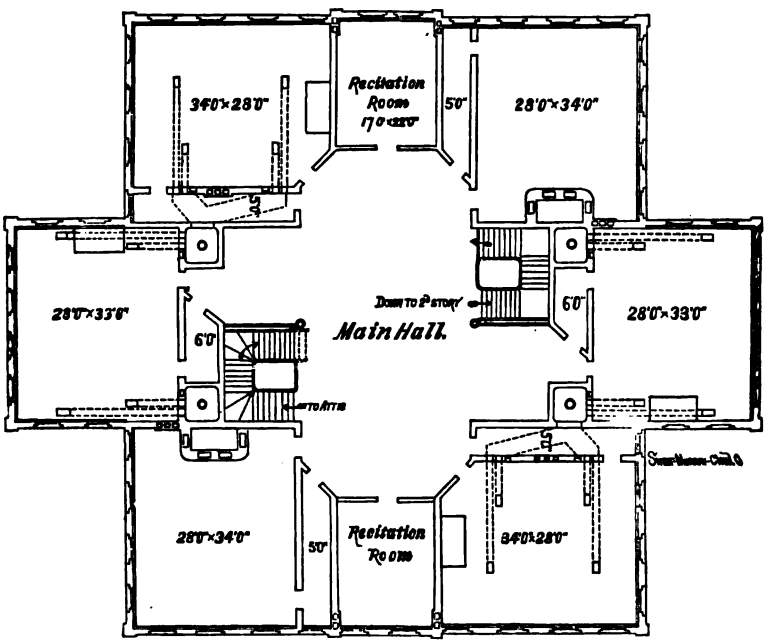
The distinguishing features of the plan may be gathered from a description of the larger and therefore more complicated building.



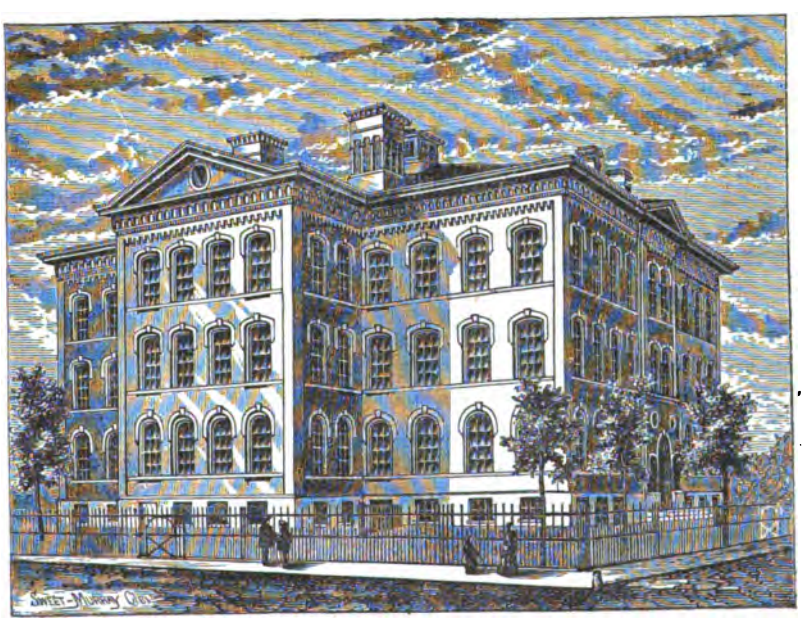
CASE SCHOOL—FIRST FLOOR.



CASE SCHOOL—SECOND FLOOR.



CASE SCHOOL—THIRD FLOOR.



CASE SCHOOL BUILDING.

THE HALLS AND STAIRWAYS.

1. It will be perceived, by glancing at the accompanying cuts, that the hallways are large, especially in the center of the building. Though very convenient, they are, perhaps, unnecessarily large as mere passage-ways, but they are unavoidable if we are to secure for the middle rooms the inestimable advantages of abundant light and air. This arrangement incidentally affords ample space for side stairways out of the general line of the hall. This large open space being thoroughly ventilated by the sky-lights, which may be easily opened in warm weather, of itself affords facilities for the ventilation of all the rooms by means of the door-ways and the fan-lights over them. But these advantages, however great they may be, are only incidental to the pushing of the middle tiers of rooms out into the sun-light.

WARMING.

2. The building is warmed by steam, three radiators being placed in each school-room, under the windows, and rising to the height of the window sill. Pure air is admitted to the school-room by means of apertures made by leaving out two courses of brick under the stone sills of the windows the entire width of the window-casing. Into this aperture an iron frame is fitted with a valve, or lid, which can be opened or closed to any desirable degree by means of a lever, which is readily managed by raising or depressing a knob placed at the sides of the radiator. The air is thus admitted into a chamber behind the wainscoting, whence it passes through hundreds of perforations, and then directly between the pipes of the radiators into the school-rooms.

VENTILATION.

3. The ventilation of the school-rooms and halls is thoroughly secured by means of four ventilating-shafts or stacks, each one of which is six feet square. These stacks being near the center of the building are protected against extremes of cold, and being warmed by thin cast-iron chimney-flues from the furnaces, a strong ascending current is uniformly maintained. It may be asked why the capacity of these stacks should be more than twice the aggregate capacity of all the apertures provided for the admission of fresh air. The following extract from the "Handbook of Hygiene and Sanitary Science," by George Wilson, the "Medical Officer of Health for the Warwick (England) Union of Sanitary Authorities," will sufficiently answer the question:

"The amount of air found to be issuing up chimneys or other outlets, is a far more reliable index of the fresh-air supply than the amount actually ascertained to be entering

through the inlets; and, indeed, the fresh-air supply can only be fairly estimated in this way. As already stated, the air enters through every chink and cranny, and in dry plastered walls, may enter, to no slight extent, through the walls themselves. Hence the difference between the amount of air found to be entering through the regular fresh-air inlets, and that found to be issuing through the outlets, is often very great. In a ward containing fifteen beds, with one door, eight windows, and four inlets for fresh air, I have found that while only 880 cubic feet of fresh air were entering through the inlets per bed per hour, as much as 3,150 were found to be issuing up the two chimneys and the three extraction-flues of the ward. During the experiments the door and windows were shut, and brisk fires kept burning in the two ventilating fire-places. The large amount, therefore, of 2,270 cubic feet per bed per hour entered through chinks in the window-frames, and beneath and around the closed door. Very probably, in this instance, a considerable amount was also drawn, by the extractive force of the chimneys and flues, through the walls, inasmuch as they were built of brick, and were only white-washed and not plastered."

It ought to be added here that, in warm weather, when the furnaces are not running, fires may be built at the base of the smoke-flues, suitable grates being provided for that purpose.

4. Ducts, each measuring one square foot net, from floor-registers disposed in different parts of the room, conduct vitiated air into the stacks. Besides these ducts, from one to three registers of the largest size (28 by 42 inches) are placed in the stacks, near the floor of each room, wherever possible. The average superficial area of the registers in the several rooms is about sixteen feet. The advantage to be gained by distributing the foul-air registers as widely as possible, is the avoidance of currents which might otherwise be pernicious.

The School Rooms.

5. The school rooms are all 28 by 33 feet in size, those of the lower stories being 14, and those of the third 18 feet in height. They are seated to accommodate from 56 to 64 pupils each, though it is designed to maintain an average not greater than 50 pupils to the room. This affords 18 square feet of floor space, and more than 250 cubic feet of atmosphere to each pupil.

6. Every room is so constructed that the teachers' desks may be located at the inner *end* of the room, with the following advantages:

(*a*) Less room is lost in passage-ways and open space than if the desk of the teacher were placed at the side of the room.

(*b*) The entrance into the room during study hours is directly into the open space where the desk of the teacher is located.

(*c*) There is a blackboard, unbroken by door or window, in front of the pupils, and always convenient to the teacher; there is a blackboard eighteen or twenty feet in length at the left of the pupil, and opposite

the principal light. Though these two blackboards are all-sufficient for ordinary use, others are to be found on the outer walls wherever there is sufficient space for one.

Light.

7. The pupils uniformly are so seated that they receive the principal light from the left. The shadow of the hand is, therefore, never cast over the space to be written upon. There is no need of the pupils shifting from side to side to get a good light. The windows in the rear can be shaded so as to cut off the light entirely from that quarter, yet they are there to afford a draft, if necessary, in very warm weather, and to supplement the principal light in cloudy days.

8. The principal light, and the one usually depended upon being admitted at the side of the room, it has less distance to travel than if admitted at the end. This is of special importance on dark days, particularly in cities where much bituminous coal is used.

Cloak Rooms.

9. There is a light and well ventilated cloak-room attached to each school-room. Pupils coming to school on time can enter through the cloak-room, but the door thereto being closed by a spring lock, he is compelled to enter the school-room directly. In this way the clothing of the pupils is protected from petty thefts, which sometimes cause no little annoyance, and sometime serious loss.

10. The outer door of the cloak-room is so located that the teacher standing at the door of the school-room can exercise surveillance over the school-room, the cloak-room, and the hall, by which means the government of the entire school is greatly facilitated.

Success.

The three buildings erected on the plan above described, especially the last, wherein all the features to which attention has been directed have been more faithfully and generously carried out, are said to be well ventilated. The test of success is that visitors entering the rooms at any season do not detect any foulness in the atmosphere of the rooms, and that teachers most susceptible to the deleterious influence of foul air are not tempted to open the windows at any time, except in very warm and sultry weather. If a more active circulation of the air be desired, it will be necessary only to provide for the more thorough warming of the ventilating shafts, which may be easily done at any time.

Respectfully submitted,

Andrew J. Rickoff.

ON THE EXHIBITION IN SCIENCE TEACHING.

REPORT OF PROF. T. C. MENDENHALL.

To the State Centennial Board:

GENTLEMEN: As one of the Assistant Educational Commissioners appointed by the State School Commissioner, Hon. C. S. Smart, to take charge of the Ohio Educational Exhibit at the Centennial Exhibition at Philadelphia, I beg leave to offer the following report:

The four assistant commissioners appointed agreed not only to divide the time of their attendance upon the Exhibition so that the State might be continuously represented, but it was also understood that as far as might be convenient each member of the commission should give attention to the educational development in a particular direction, as illustrated and exemplified in the exhibits of foreign governments as well as those of the American States. In consequence of this division of labor I will undertake in this report to speak briefly of the evidence to be found in the exhibition of the condition of instruction in the Natural Sciences, and the various appliances and facilities shown for the perfection of that instruction.

It may safely be said that until within a very few years no systematic instruction in the natural sciences was to be found in the lower grades of public or common schools in any country. Recently, however, the attention of leading educators every where has been given to this matter, and, as was anticipated, many results of this innovation were to be seen in the display at Philadelphia. It was easily seen that while other branches of natural science had found their way into the schools, physical science, especially as represented in elementary physics, has secured the earliest and foremost place. Already for several years many of the leading schools in Ohio have given this and kindred branches a place in their courses of study, but it must be admitted that in our exhibit of work in this direction, as compared with that made by other States and foreign governments, we hardly did our educational system justice. The display made by other States was in very many respects superior.

Our exhibit consisted almost entirely of the results obtained through our system, as shown in the actual work, in examination and recitation of the pupil, to the almost entire exclusion of the means and appliances made use of to attain these results. Yet, as we best judge a tree by its

fruits, our rooms furnished facilities for becoming thoroughly acquainted with the school system of our State, which were noticeably lacking in other exhibits—a fact soon discovered by thoughtful explorers, and favorably commented upon by many visiting educators from our own and other countries. The work done in natural science instruction, like other work, was to be found in examination and recitation papers exhibited by the various cities and towns in the State, and also found some expression in the many beautiful specimens of drawing made by Ohio pupils. No models or specimens of apparatus, either of a high or low grade, were exhibited, and in this respect we evidently failed to do our full duty. A most valuable addition of this kind might have been made to the exhibit, including apparatus both of a low and high grade, as well as the results of its use in the school-room. It will be admitted, however, that while several of our best and oldest high schools are provided with fair equipments in the way of apparatus and appliances, there are still many without any adequate provision in that direction, and that our schools of a lower grade, although instruction in science is given in many of them, are almost entirely lacking in the requisites for doing the work with that illustration and exemplification upon which its success depends. The value of the exhibition, and especially the usefulness of this report to the schools of Ohio, will depend largely upon our willingness and readiness to detect our own shortcomings as revealed in a contrast of our own with other school systems. I take the liberty, therefore, to present to you, and through you to those more directly interested in the educational work of the State, some facts gathered in various educational departments, which represent the provisions made for science instruction elsewhere. From our country perhaps no State made so good a showing in this respect as Massachusetts. That commonwealth has long held a foremost position in educational affairs, and the demands for technical instruction, due largely to the occupation of many of her people, have found a response not only directly, but indirectly in the great interest exhibited in natural science instruction, both in higher and lower schools. Much might be written of the well-arranged display of the appliances for science teaching, both from her ancient and honored universities and colleges, and from her common and primary schools. Particular mention ought to be made of the exhibits offered by the two principal technological schools of the State, the Massachusetts Institute of Technology, and the Worcester Free Institute. From these institutions was shown a variety of models, drawings, and students' work which made the absence of any thing of the kind in the Ohio department more keenly felt, and forced a recognition of the fact

that at least until recently our own State has made no attempt to supply this much needed instruction. The grammar and primary schools in the State seem to have kept pace with those of a higher grade in this direction. As proof of this, and especially to enable our own educators to compare the equipment of our public schools with those of some of the schools in Massachusetts, I insert here a list of apparatus furnished me at the Massachusetts department, being the amount which is supplied to each of the grammar schools of Boston. I refrain from placing by its side a list of the articles which are to be found in our own best schools of like grade.

LIST OF PHYSICAL APPARATUS SUPPLIED TO EACH GRAMMAR SCHOOL IN THE CITY OF BOSTON.

Lead Hemispheres.
Inertia Apparatus.
Capillary Tubes.
Capillary Plates.
Set of Collision Balls.
Center of Gravity.
Mechanical Powers.
Central Forces.
Illustration of the Pendulum.
Set of Geometrical Solids.
Set of Crystal Models.
Set of Cube-root Solids.
Equilibrium Tubes.
Upward-pressure of Water.
Tantalus's Cup.
Model of Pump.
Archimedes's Principle.
Pulse Glass.
Ring and Ball Pyrometer.
Compound Bar.
Fire Syringe and Tender.
Reflectors.
Wire Gauze.
Conductometer.
Principle of Ventilation.
Spirit Lamp.
Air Pump.
Plain Receiver, 1 quart.
Capped Receiver and Sliding Rod, 1 qt.
Hand Glass.
Improved Condenser.
Condensing Chamber.
Expansion Apparatus.
Bacchus Illustration.
Magdeburg Hemispheres (brass).
Barometer Apparatus.
Guinea and Feather Tube.
Wood Cylinder and Weight.
Washers, Oil for Pumps.
Bell for Vacuum.
Weight and Buoyancy.
Air Gun-Barrel.
Holtz Machine.
Insulated Conductor.
Glass Friction Cylinder.
Electroscope.
Flier.
Stand and Bells.
Movable Coat Jars.
Lightning and Miser's Plate.
Improved Set of Leyden Jars.
Ether Spoon.
Spiral Tube.
Insulated Stool.
Discharger.
Gas Pistol.
Powder Bomb.
Pith Balls for Dancing.
Cat-skin or Amalgam.
Aurora Tube.
Set of Luminous Points.
Gassiot's Cascade.
Geissler's Tube Combination.
Geissler's Tube Stratified.

The cost of the above collection is about $600.

For the same reason, I insert a similar list of instruments furnished the schools of New Bedford, Massachusetts, a town of about 20,000 inhabitants.

In the High School, Physical apparatus costing, in the aggregate, $2,000. To each of fifty "Elementary Schools," is furnished the following:

Inertia Apparatus.	Holtz' Machine.
Collision Balls.	Leyden Jar.
Illustration of Pulleys.	Ether Spoon.
Illustration of Levers.	Discharger.
Central Forces.	Spiral Tube.
Center of Gravity.	Electrical Bells.
Bar and Gauge.	Flier.
Fire Syringe.	Smee's Battery.
Wire Gauze.	Hehacal Ring.
Compound Bar.	Electro Magnet.
Air Pumps.	Needle and Stand.
Two Receivers.	Shocker.
Madgeburg Hemispheres.	Revolving Magnet.
Guinea and Feather Tube.	Equilibrium Tubes.
Rubber Capped Receiver.	Lifting Pumps.
Bolt Head.	Force Pumps.

The educational exhibit of Pennsylvania attracted much attention. It was arranged in a special building erected for the purpose by the State, and was full and complete in many respects. In the matter of a display of appliances for science teaching, it was strong only in the higher departments. Pennsylvania contains a number of colleges with excellent scientific departments, and from these came some apparatus of a high grade which was most excellent. Manufacturers of apparatus also contributed to make up the display, and altogether the building contained much excellent material which the schools *might* possess, rather than what they did possess. One or two of the high schools are, perhaps, more fully and expensively furnished with apparatus than any others in the country, but not much could be seen which indicated any thing as to the work of the grammar and common schools. I was, in fact, assured by one of the attendants in charge that no attention to natural science was paid in any of the common schools of the State—a statement which is, certainly, not well founded. The State may be proud of the fact that by the generosity of a citizen of Philadelphia the magnificent set of acoustic apparatus, exhibited by Rudolph Koenig, of Paris, was purchased for the University of Pennsylvania, and in that department that institution is probably without *a rival in the world.*

As an illustration of higher instruction in physical science, one of the

very best was from New Jersey, shown by the Stevens Institute of Technology at Hoboken. In some departments of work this institution is the foremost in the United States, and is drawing to its doors young men from Ohio and other Western States who find nothing to take *its place at home*..

Some excellent students' work was also exhibited by the University of Illinois, which deserves great credit for the evidence of good instruction, especially in mechanical engineering. It may be said of the Western States, generally, that little was shown which indicated the condition or even existence of science-teaching in the lower grades or *common schools*.

Our neighbors in Canada made a very complete educational exhibit. It contained, however, very little pupils' work, that being confined, almost entirely, to map-drawing, and some specimens, not equal to our own, of drawing from object and copy. The appliances for instruction were excellent, containing many very desirable features, rarely, if ever, met with in our own schools.

There were small, neatly-built models of bridges of various kinds; of coal mines, and models illustrating processes relating to mining and the preparation of metals.

A most excellent feature was a collection of miniature models of tools used in the trades, such as book-binding, carpeting, lead and metal work, shoe-making, etc. These were evidently inexpensive, and, in the hands of an intelligent teacher, would do great service. There were dissected and relief maps in abundance, and maps and charts illustrating physics and chemistry. There was a fair exhibit of chemical and physical apparatus, evidently exhibited by dealers. Among the other desirable things were cheap sets of apparatus, in boxes, suitable for students' uses. Among these was a "student's laboratory," containing seventy reagents, and more than twenty pieces of apparatus in a neat box, costing six dollars. Also, neat and cheaply constructed models in crystallography, natural history preparations, physiological preparations, collections of metals and metallic ores, sectional models of steam engine, boiler, and locomotive, and a flexible globe, which could be folded up. In the higher forms of apparatus the exhibit was much inferior to that of the United States.

Several foreign countries taught us valuable lessons in their exhibits, and probably none more than Sweden, whose educational department attracted universal attention. The exhibit was contained in a primary country school-house, with accessions of furniture, books, maps, and apparatus for instruction: size, forty by fifty feet. It was situated in the exhibition grounds, north of the main building, and consisted of a one-

story frame house, containing school-rooms, and the interior arrangements of a Swedish school-house. The frame-work of the building was imported from Sweden, and was on exhibition by G. O. Wengström, of Stockholm. The excellent display in the way of school-furniture, maps, charts, etc., will, no doubt, be referred to by other members of the commission. The very complete series of text and reference books, the atlases, the globes, the black-board map, the geographical pictures, and numerous other aids to the study of historical geography could not fail to excite the highest admiration. Through the kindness of the commissioner in charge I was permitted to make a thorough examination of the apparatus for instruction in elementary physics, and was furnished with a price list of the same.

The simplicity in construction, and general efficiency of these articles can not be too highly praised. They are such as are furnished to all of the common, or what are there known as primary schools. Below is the list:

Lampstand with Berzelius's Alcohol Lamp.
Glassblower's Lamp, with Table.
Balance, with Specific Gravity Apparatus.
Hydrostatic Apparatus.
Air Pump; used for both Attenuation and Compression.
Water Pump; Suction and Force-pump.
Lever.
Pendulum Stand, with two Pendulums.
Elasticity; Bars of Iron and Steel.
Barometer.
Thermometer.
Bar Magnets.
Compass.
Three Glass Lenses.
Telescope (Astronomical and Terrestrial).
Microscope.
Glass Prism.
Concave Mirror.
Convex Mirror.
Electrical Machine.
Leyden Jar.
Electric Pile (two Elements).
Electro Magnet.
Centrifugal Machine.
Inclined Plane.
Pulley.
Parallelogram of Forces.
Adhesive Plates.
Pyrometer.
Apparatus to show the Conduction of Heat by Solids.
Apparatus for showing the Upward-pressure of Liquids.
Magdeburg Hemispheres.
Glass Bell.
Fall Tube.
1 lobe, for Weighing Air.
Sound Plate, on a foot.
Tuning Fork.
Fiddle Bow.

The total cost of these articles is less than $125. In addition to these were extensive Natural History collections and preparations, and it is worthy of note that there was on exhibition a ventilating apparatus for schools, and also an air purifying apparatus. The exhibit also contained many fine specimens of apparatus of a higher grade, for illustration and research, the very fine printing Meteorograph of Theorell being, particularly deserving of notice. The displays of other Foreign countries might

be referred to with equal profit; and it would be especially agreeable to the writer to be able to refer at length to the excellent exhibition of Chemical and Physical apparatus made by several of the leading English, French, and German makers, but the necessary limits of this report will not permit it. I cannot close, however, without brief reference to what seems to be the lesson to be learned by Ohio educators and those interested in the advancement of the best interests of the State. It must be confessed, that in contrast with some of our sister States, and with many foreign governments generally supposed to be less active in the elevation of all the people than are we, we are sadly in the rear in the matter of science teaching. Very few of our public schools of the highest grade, possess what might be called a decent equipment for this work, while in the schools of lower grades, either nothing is done, or often the whole labor of furnishing and supplying, as well as of using, is thrown upon the shoulders of the teacher. In Ohio, many energetic teachers have recognized the pressing necessity, and have supplied what they were able to purchase or manufacture, often without any aid or sympathy from the authorities. Such a state of things ought not to exist longer. Boards of Education ought not to hesitate in the expenditure of fifty or a hundred, or several hundred dollars, for material appliances which will add so much to the quantity, and improve so vastly the quality of science teaching. We are justly proud of our school system and of its results, and in many respects we are in the foremost ranks; but the lesson of the Centennial year is, certainly, that systematic instruction in science must begin, and that we must not be defeated because it will cost money to win.

Respectfully,

T. C. MENDENHALL,

Assistant Commissioner Ohio Educational Exhibit.